A STRUCTURAL ANALYSIS OF THE ECONOMY OF ORISSA STATE

(Within Input-Output Framework)

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

by

SARAT CHANDRA DHAL

to the

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
INDIAN INSTITUTE OF TECHNOLOGY KANPUR

July 1996

CERTIFICATE

It is certified that the work contained in the thesis titled "A Structural Analysis of the Economy of Orissa State (Within Input-Output Framework)", by Mr. Sarat Chandra Dhal, has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.

Date : 1st July, 1996

(K.K.Saxena)
Professor of Economics
Department of Humanities & Social Sciences
Indian Institute of Technology, Kanpur
Uttar Pradesh 208 016, India

Certificate

This is to certify that Mr. Sarat Chandra Dhal has satisfactorily completed all the course requirements for the Ph.d programme in Economics. The courses include;

ECO 736 INDUSTRIAL ORGANIZATION AND POLICY

ECO 737 DEVELOPMENT ECONOMICS

ECO 739 PRICE THEORY

ECO 740 INTER-INDUSTRY ECONOMICS

ECO 744 REGIONAL ECONOMIC ANALYSIS

ECO 745 MONETARY ECONOMICS

Mr Sarat Chandra Dhal was admitted to the candidacy of the Ph.d degree in December, 1991 after he successfully completed the written and oral qualifying examinations.

Head
Department of H.S.S
I.I.T, Kanpur 208 016

Convenor
Departmental Post Graduate
Committee

ACKNOWLEDGEMENT

I would like to express my deep gratitude, and sincere thanks to my thesis supervisor Professor K.K.Saxena for his invaluable guidance and encouragement throughout the course of this study.

I am extremely thankful to Professor & Head, R.R.Barthwal, Professor T.V.S. Ramamohan Rao, Professor B. Rath, Professor B.N. Pattanaik, and Dr. Sumjeet. Sinha for their encouragement.

I am extremely thankful to my present organisation Reserve Bank of India, Bombay, for granting me leave at the crucial stage of submission of my thesis. I acknowledge with deep appreciation the encouragement by all the senior members of my present organisation.

I am sincerely thankful to staff Mr J.P. Gupta, Mrs Dalvi, Mrs Rout, and Mr Puri for their help in the preparation of this thesis. I am also thankful to the staff of H.S.S. Department.

I would like to place on record my sincere thanks to my friends Satyananda, Umakanta, Sabita, S.P. Sharma, Debu and Asheem, for encouraging me in many respects during my stay in the campus.

A big debt is owed to my wife Gayatri, and my loving son Abhilash for tolerating with my negligence during the course of this study.

Sarat Chandra Dhal

Chapter 2

METHODOLOGY AND DATA SOURCES

As mentioned in chapter 1, the main focus of this study is to prepare an input-output table for the state of Orissa. Hence, in this chapter we present the methodology for preparing a regional input-output table and sources of data for the present study.

2.1 Methodology

2.1.1 The Input-Output Approach

In post war economics literature, a great deal of theoretical and empirical attention has been devoted to the subject of input-output analysis following the appearance of Nobel laureate Wassiely Leontief's pioneering model for the U.S. economy. Today, input-output models are widely and uniquely used at the international, national, regional and local levels for planning purposes by the government as well as the non-government organizations. It has been accepted by the economics literature as one class of the computable multi-sectoral macroeconomic general equilibrium model, far superior to other aggregative macroeconomic models. There have been several reasons for the phenomenal growth of the input-output literature. Some of the important reasons are the followings:

SYNOPSIS

Name of the student : Sarat Chandra Dhal

Degree for which submitted : Ph.d

Department : Humanities And Social Sciences

Thesis Title : A Structural Analysis of the Economy of Orissa State (within Input-Output Framework).

Name of Thesis Supervisor : Prof. K.K. Saxena

Month and Year of Submission: July 1996

Regional disparity is a ubiquitous phenomenon in both developed and developing economies. But in the latter it is more acute and glaring. National economies are often composed of sets of smaller and localized economies. If the national economy is to prosper then its constituent regional economies must be brought into some sort of harmony.

In India too, area disparities in the level of poverty, unemployment, income, infrastructure, agriculture, industry, and above all the level of living of the people exist substantially across the regions. Numerous measures have been undertaken in the last forty years of planning to achieve balanced regional development of the country. Yet, wide disparities in area development continues in this country. The most pitiable situation is that the most resource rich states such as Orissa, Bihar, Madhya Pradesh, Assam, and Utttar Pradesh are the regions with high poverty pockets.

In this regard, regional scientist in India have ascribed area disparities to the `top to bottom level approach' of national level planning process. The national level planning process lacks specific and local assessment of the problems, resources and productive potentials of the micro level regions in general, and of the backward regions in particular. Many have viewed that a necessary step to introduce the regional dimensions into the national level planning process must involve a detailed mapping exercises of the economic structures of the micro level regions, at least of the states if not districts or blocks. Thus, during 1970s, there appeared several regional studies for various states of India within multi-sectoral input-output framework in order to facilitate the planning process and achieve thereby, an efficient utilization of scarce resources at the state level.

However, the poorest `Orissa' state has had no such study till date. In view of this gap, the present study has endeavoured to study the structure of Orissa state's economy within input-output framework. Since there was no input-output table for Orissa state, the main objective of the present study has been to prepare input-output tables for this state on the basis of available informations. Once an input-output transaction table is prepared, it may multiply a number of studies within this framework and at the detailed sectoral level for a wide range of problems. For an individual researcher, it would not be possible to go for a study based on detailed survey of current information for a backward region like Orissa state. Therefore, the study is based on past data

$$A = \begin{bmatrix} a11 & a12 \ldots\ldots\ldots\ldots\ldots\ldots a1n \\ a21 & a22 \ldots\ldots\ldots\ldots\ldots\ldots a2n \\ \vdots & \vdots \\ an1 & an2 \ldots\ldots\ldots\ldots\ldots\ldots ann \end{bmatrix} \qquad (2.6)$$

Now substituting the relation described by the equation (2.5) into the equation system (2.1), the equation system (2.1) encompassing the technical structure can be expressed as in the following:

$$X_i = \sum_j a_{ij}.X_j + \sum F_{ik} \qquad (2.7)$$

In matrix notation, this equation system (2.7) can be written in detail as the following:

$$X = A.X + C + G + I + E - M \qquad (2.8)$$

where X denotes for the column vector of sectoral gross output, A for the technical input-output coefficients(square matrix), C for the column vector of private consumption of commodities, G for government's current expenditure on various sectors, I for investment in various sectors, E for export of commodities, and M for import of commodities into the domestic economy. In simplified form, we can denote the sum of all final components as F and the equation system resolves to

$$X = A.X + F \qquad (2.9)$$

The output solution to the system (9) for given F can be achieved as

labour productivity of more than 50 thousand rupees per persons employed.

Interestingly, it was observed that leading sectors in terms of size of output and employment, such as agriculture, and service sectors did not have higher labour productivity.

3.2.9 Structure of Capital

The capital coefficient matrix is given in the Table 3.4. Based on this a summary of sectoral capital output ratios is given in table 3.4.1. The overall capital output ratio was highest for the Railway sector followed by electricity 3.686, machinery 3.510 storage 2.260, Iron and steel 2.022 mines 2.000, transport 1.88, miscellaneous manufacturing 1.970, banking 1.828, coaltar 1.710, communication 1.670, fertilizer 1.515, jute 1.111, chemicals 0.915, agriculture 0.898, beverages 0.803, and non-metallic minerals 0.559.

It was observed that most of the services, mining and non-agro based manufacturing sectors had higher average capital output ratios in comparison to the agriculture and agro-based manufacturing sectors.

The broad observations on the composition of the sectoral capital output ratios were the followings :

(i) For the agriculture and agro-based manufacturing sectors, finished goods constituted the largest component of capital followed by semifinished raw materials, machinery, and construction materials in order.

(ii) For most of the non agro-based manufacturing sectors, machinery items constituted the largest component of capital followed by finished goods, raw materials and construction.

collected from published sources. The year 1983-84 has been chosen as the year of reference. The most important reason for taking this reference year is that detailed input-output data required at the industry level, which are published by Annual Survey of Industry of the Central Statistical Organisations, are available latest for the year 1983-84.

On the basis of available data, thirty one sectors consisting of one agriculture and its allied sectors, one mining sector, twenty three manufacturing sectors, and six service sectors have been considered. Two core tables, one for inter-industry transactions and another for capital coefficients, have been prepared for Orissa economy. A simplest kind of dynamic input-output model has been operated to estimate and analyze the three most important macro performances, such as, output, income, and employment multipliers of various sectors of Orissa economy. The main findings of the study are as under:

Firstly, the most important finding of this study has been that the objectives of maximum output, income, and employment could not be achieved simultaneously in the Orissa economy. This observation has been due to our estimates of low rank correlation coefficients between different types of output and income multipliers, and between output, and employment multipliers of various sectors. Thus, this finding suggest us that the policy makers of Orissa state may have to make some sort of ~~trade off~~ between output (or alternatively 'growth'), income, and employment objectives.

Table 3.5 Static Leontief Inverse Matrix for Orissa, year 1983-84

STATIC LEONTIEF INVERSE MATRIX

ctors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.0675	0.0047	0.4756	0.0772	0.3329	0.2370	0.1212	0.0736	0.4769	0.0972	0.4130	0.0394	0.0034	0.0326	0.0503	0.0470
2	0.0008	1.0052	0.0015	0.0164	0.0020	0.0064	0.0062	0.0139	0.0026	0.0651	0.0013	0.0039	0.4914	0.0352	0.0219	0.1555
3	0.0015	0.0009	1.0426	0.1529	0.0124	0.0050	0.0020	0.0022	0.0037	0.0025	0.0010	0.0072	0.0006	0.0077	0.0168	0.0075
4	0.0000	0.0000	0.0000	1.0099	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
5	0.0000	0.0000	0.0000	0.0000	1.0013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	1.0655	0.0001	0.0559	0.0005	0.0001	0.0077	0.0027	0.0000	0.0001	0.0014	0.0001
7	0.0002	0.0001	0.0051	0.0011	0.0011	0.0012	1.0164	0.0016	0.0003	0.0003	0.0001	0.0013	0.0000	0.0134	0.0024	0.0507
8	0.0006	0.0000	0.0001	0.0000	0.0001	0.0000	0.0010	1.0019	0.0001	0.0002	0.0001	0.0006	0.0000	0.0000	0.0000	0.0001
9	0.0001	0.0003	0.0002	0.0019	0.0004	0.0005	0.0004	0.0005	1.0255	0.0021	0.0002	0.0005	0.0002	0.0004	0.0010	0.0003
10	0.0002	0.0020	0.0029	0.0012	0.0125	0.0043	0.0143	0.0009	0.0006	1.0433	0.0014	0.0059	0.0012	0.0022	0.0128	0.0034
11	0.0000	0.0001	0.0014	0.0002	0.0004	0.0003	0.0009	0.0001	0.0000	0.0001	1.0417	0.0001	0.0000	0.0002	0.0002	0.0002
12	0.0001	0.0002	0.0002	0.0001	0.0001	0.0002	0.0001	0.0013	0.0026	0.0002	0.0154	1.0427	0.0001	0.0015	0.0018	0.0003
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
14	0.0099	0.0001	0.0045	0.0008	0.0031	0.0024	0.0011	0.0007	0.0044	0.0009	0.0039	0.0004	0.0000	1.0256	0.0016	0.0005
15	0.0002	0.0035	0.0008	0.0156	0.0004	0.0057	0.0077	0.0039	0.0007	0.0170	0.0106	0.0344	0.0019	0.0196	1.0526	0.0016
16	0.0000	0.0000	0.0000	0.0008	0.0000	0.0001	0.0009	0.0000	0.0026	0.0001	0.0000	0.0001	0.0000	0.0003	0.0010	1.0611
17	0.0006	0.0003	0.0005	0.0119	0.0003	0.0013	0.0012	0.0006	0.0008	0.0013	0.0005	0.0029	0.0005	0.0073	0.0060	0.0084
18	0.0010	0.0024	0.0012	0.0178	0.0013	0.0066	0.0033	0.0011	0.0032	0.0048	0.0016	0.0093	0.0032	0.0100	0.0127	0.0429
19	0.0002	0.0012	0.0004	0.0007	0.0007	0.0010	0.0014	0.0002	0.0041	0.0027	0.0004	0.0017	0.0016	0.0017	0.0086	0.0021
20	0.0001	0.0010	0.0002	0.0005	0.0002	0.0012	0.0005	0.0001	0.0004	0.0009	0.0014	0.0004	0.0008	0.0019	0.0049	0.0040
21	0.0009	0.0096	0.0029	0.0040	0.0055	0.0053	0.0103	0.0009	0.0011	0.0194	0.0011	0.0017	0.0137	0.0108	0.0072	0.0147
22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008
23	0.0050	0.0027	0.0043	0.1219	0.0023	0.0086	0.0102	0.0046	0.0061	0.0100	0.0039	0.0097	0.0039	0.0262	0.0188	0.0175
24	0.0029	0.0196	0.0037	0.0078	0.0035	0.0181	0.0261	0.0041	0.0137	0.0332	0.0038	0.0120	0.1252	0.0502	0.0259	0.0652
25	0.0002	0.0002	0.0151	0.0189	0.0014	0.0021	0.0003	0.0004	0.0004	0.0005	0.0001	0.0008	0.0006	0.0051	0.0038	0.0014
26	0.0022	0.0045	0.0014	0.0038	0.0010	0.0053	0.0018	0.0010	0.0021	0.0082	0.0012	0.0026	0.0047	0.0200	0.0111	0.0475
27	0.0059	0.0160	0.0054	0.0150	0.0087	0.0410	0.0320	0.0127	0.0180	0.0124	0.0153	0.0246	0.0090	0.0338	0.0253	0.0397
28	0.0000	0.0000	0.0019	0.0010	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
29	0.0003	0.0005	0.0027	0.0007	0.0008	0.0023	0.0005	0.0023	0.0006	0.0030	0.0003	0.0010	0.0005	0.0012	0.0040	0.0029
30	0.0205	0.0217	0.0292	0.0261	0.0123	0.1263	0.0481	0.0594	0.0956	0.0661	0.0147	0.1993	0.0163	0.1505	0.1220	0.2178
31	0.0043	0.0120	0.2403	0.0374	0.0604	0.0244	0.0030	0.0165	0.0054	0.0100	0.0024	0.0086	0.0065	0.0289	0.0254	0.0251
lumn sum	1.1247	1.1090	1.8442	1.5458	1.4657	1.5723	1.3110	1.2607	1.6721	1.4016	1.5431	1.4138	1.6855	1.4865	1.4389	1.8178

continued

Secondly, in view of sectoral total income and employment multipliers, the study has found that the heavy sectors such as iron & steel, machinery, fertilizer, electricity and some service sectors, transport, banking and communication could not lead over other existing sectors of the Orissa state such as food, wood, tobacco, cotton, misc.textiles, paper, and cement. But at the same time, the study has observed that above heavy industries could lead over other sectors in view of total output multipliers. The reason for low linkage effects of important sectors such as fertilizer,electricity, and service sectors has been due to low degree of industrialization and thereby low industrial dependence on above sectors in the state.

Thirdly, in view of Rassmusen's linkage analysis, the study could not observe a good number of manufacturing sectors as the `key sectors' of growth. Among the key sectors of growth with comparatively higher backward as well as forward linkages were the two manufacturing sectors such as iron & steel, and machinery and others were construction, and trade sectors. A large number of sectors displayed final or primary nature of their linkages with other sectors.

Fourthly, it was possible for the study to establish "Leontief Paradox" for the Orissa economy. The study has observed that the state is exporting commodities of capital intensive sectors of minerals, and metal alloys though the state is capital scarce region. On the otherhand, the state is importing invariably all kinds of labor intensive agro-processing products though the state is labour abundant and

agriculture is the main occupation of the state. Further, there is wide gap between the demand and supply position of agro-processing products which give rise to import of such commodities from outside the state. Unless there is an effort to increase the supply of agro-processing products, there could not be any income, and employment gains to Orissa economy from external trade transactions, comprising of transactions both with the overseas and outside regions within the nation. It was observed that per one hundred thousand rupee transaction of export and import, there would be loss of employment of five persons and a loss of capital of seventy four thousand rupees.

Fifthly, in an attempt to grasp technical changes between the two years 1983-84 and 1992-93, by using the RAS method, the study found that productive and substitution effects of various sectors have not been sufficient to give rise to any qualitative change in the overall technical structure of Orissa economy. This finding indicates that in the last decade, the economic policy environment of the country has had no perceptible impact on the production structure of the backward Orissa economy. Besides, our analysis of productivity and substitution effects may serve another purpose: If the policy makers want to bring out some essential changes in the production structure, then they need to know where the changes should occur and in what form! This way, productivity and substitution effects can also guide them. In this regard, we have observed that most of the sectors, except few sectors which are final nature such as food, and wood, have the

A high U_j means that a particular industry draws unilaterally on the system of industries and a low U_j means that an industry draws evenly from other sectors. The index U_i can be interpreted in the similar way. The estimated sectoral backward and forward linkage indices denoted by U_j and U_i have been given in Table 5.1. On the basis of these estimated indices, two criterion values β_1 and β_2 for U_j and U_i indices, respectively, have been developed to classify various sectors into four categories.

First, the criterion value β_1 for U_j indices (backward linkages) is defined as below :

$$\beta_1 = 1/n \sum_{j=1}^{n} U_j$$

where U_j terms are sectoral backward linkage indices and 'n' is the number of sectors. If U_j is greater than β_1, then a sector is considered in the manufacturing category. If U_j is less than β_1 then a sector is considered as primary type.

Similarly the criterion value β_2 for forward linkage indices U_i is defined as

$$\beta_2 = \sum_{i=1}^{n} U_i/n$$

If U_i is greater than β_2, then a sector is intermediate type and if U_i is less than β_2 then a sector is final type. Further, it may be noted that theoretically, the criterion

medicines and drugs. When we deal with chemical sector as a whole, the importance of above product details are not explored. Therefore, a more disaggregated sector classification may be followed in the future research.

Finally, for iron and machinery sector we have found that they have comparatively high backward and forward output linkages. But such an optimism about this sector can not be isolated from the underdeveloped production conditions in other related sectors. It is obvious when we compare output effects between different sectors of an economy, one heavy industry could dominate all other sectors. But the real test remains whether the presence of such heavy industries associated with unevenly greater policy attention, can improve the production linkages in rest of the sectors. This way, we did not find the production structure of Orissa economy quite appealing. Policy makers need to explore further an indepth analysis of technical structure of the economy at more disaggregated levels and carry out suitable strategies to strengthen the inter-industrial linkages within the region.

5.4 Concluding Remarks

The input-ouput type multipliers and linkage measures provide us with a wealth of informations about the impact of sectoral production and capital structures of an economy on the level of important macro indicators like output, income, and employment at the dissaggregated sectoral level. However, the level of output, income, and employment of an economy could also depend upon another important factor such as the sectoral

potential to increase technical dependence from forward side. On the otherhand, some matured sectors such as iron & steel, fertilizer etc. could not improve their inter-industry dependence from backward side. Lastly, an welcome development has been that many sectors were able to increase their dependence with the service sectors between the year 1983-84 and the year 1992-93.

Finally, the study has suggested that the state must endeavor to achieve short term objectives of maximum income and employment by promoting the income and employment intensive agro-based sectors of the economy for improving upon the general underdevelopment in the region. At the same time, the study has suggested that the policy makers of this poor state should not discourage the producers who may be interested in undertaking production risk in the heavy sectors because a complete neglect of growth oriented sectors can create supply bottlencks and may cause a decline in the production base for this poor economy. Resources must be allocated efficiently on the basis of total and indirect income and employment performances within this underdeveloped Orissa state.

DEDICATED

TO

MY PARENTS AND RELATIVES

Table 6.1 External Trade Statistics for Orissa, year 1983-94

Sector no	Sectors	Gross output	Total Domestic Demand	Export	Import	Export to Total Demand (percent)	Import to Total Demand (percent)
1	agriculture	35709040	35915366	645270	851596	1.80	2.37
2	mining	1665900	1429644	345599	109343	24.17	7.65
3	Food	1271048	1566997	1643	297592	0.10	18.99
4	beverages	24776	395359	0	370583	0.00	93.73
5	tobacco	167265	319538	0	152273	0.00	47.65
6	cotton	544934	1679341	41842	1175449	2.44	69.99
7	jute	68797	191054	0	122257	0.00	63.99
8	misc.manufacturing	28969	564663	0	535694	0.00	94.87
9	wood	170176	1455627	0	1285451	0.00	88.31
10	paper	1026256	196053	830203	0	423.46	0.00
11	leather	11393	58135	0	46742	0.00	80.40
12	rubber	54111	169322	2956	118167	1.75	69.79
13	petrol & coaltar	304	1960706	0	1960402	0.00	99.98
14	fertiliser	340806	1023974	0	683051	0.00	66.71
15	chemicals	308162	1723760	8081	1423679	0.47	82.59
16	cement	621559	213813	407746	0	190.70	0.00
17	non metallic minerals	1223452	1459426	315005	550979	21.58	37.75
18	iron & steel	8429415	4410479	4018936	0	91.12	0.00
19	basic metals	331429	543166	64059	275796	11.79	50.78
20	metal	115254	667614	1474	553834	0.22	82.96
21	machinery	451531	1848880	4453	1401802.00	0.24	75.82
22	misc.manufacturing	5382	301533	0	296151	0.00	98.21
23	construction	6974274	6974274	0	0	0.00	0.00
24	electricity	1264103	2342736	0	1078633	0.00	46.04
25	gas	175454	178421	0	2967	0.00	1.66
26	railway	1451633	1086336	365297	0	33.63	0.00
27	transport	4177649	3017070	1160579	0	38.47	0.00
28	storage	2863	65170	0	62307	0.00	95.61
29	communication	238954	290395	0	51441	0.00	17.71
30	trade	6382192	5001336	1380856	0	27.61	0.00
31	banking	1100200	1071538	28662	0	2.67	0.00
	Total	74337284	78121728	9621861	13406189	12.32	17.16
	Ratio to gross output	1.0000	1.0509	0.1294	0.1803		

CONTENTS

of known row and column sums $U_{i,t}$ and $V_{j,t}$. The model in (7.4) may be solved iteratively until the forecasted row sums and column sums converge to the observed row sums and column sums of various sectors. In practice, it may not happen so or else it may involve a large number of iterations. Therefore, a convergence criterion can be imposed so as to reduce the number of iterations. Usually, the convergence criterion that the difference between the forecasted column sums (row sums) and observed column sums (row sums) of each sector should be within an error of 5 percent.

7.2.2 Empirical Operation of RAS Methodology

The empirical operation of the RAS procedure starts with an initial approximation to either of the two effects productivity effect (sj) and substitution effect (ri) as defined below:

$$\left(\sum_{i=1}^{n} a_{ij,t} \Big/ \sum_{i=1}^{n} a_{ij,o}\right) = \sigma_j, \quad i = 1,\ldots,n$$

or

$$V_{j,t}/V_{j,o} = \sigma_j \approx s_j$$

and (7.5)

$$\sum_{j=1}^{n} a_{ij,t} \cdot X_{j,t} \Big/ \sum_{j=1}^{n} a_{ij,o} \cdot X_{j,t} = \mu_i, \quad j=1,..,n$$

or

$$U_{i,t}/U_{i,o} = \mu_i \approx r_i$$

where we have $V_{j,t}$ for the average input-output coefficient of the sector j in the year t and $V_{j,o}$ as the average input-output coefficient which is also the column sum of input-output coefficients of the sector j in the base year. Similarly, $U_{i,t}$

to be used in promoting the objective of reducing regional disparities are matters of great concern these days.

8.1.2 Strategy of Regional Development

Hirschman (1961), a protagonist of deliberate sectoral unbalancing of economic development at the national level to lead ultimately to sectorally balanced national economic development, was however not in favour of a policy of regional unbalancing of economic development to bring out, ultimately, balanced regional development. It is the growth pole strategists, who actually favour such a view. Perroux (1950, 1964, 1970), the originator of the theory, worked in terms of abstract space and looked upon growth as a discontinuous process, attributable mainly to innovative entrepreneurs in a dynamic world starting leading propulsive industries at certain points and affecting the rest of the economy by means of inter-industry linkages. Boudeville (1966) gave the concept of regional content and visualized growth poles as urban centers, where fast growing industries agglomerate to reap economies of scale, resulting in regionally uneven development of the economy. Pottier (1963) develops these even further to link up transportation network with urban hierarchies and spatial growth poles in his work on development axes which are used to show that economic development tends to be concentrated along main transportation routes linking urban industrial centers. Underlying the growth poles approach is the view that the initial regional unbalancing would lead, in long run, to regional balancing as a result of linkage of propulsive

studies may recognize the bottlenecks and must be incorporated into the modelling exercise.

Finally, specific functional forms to integrate the variables and parameters must be decided on the basis of availability of data and on the basis of some past studies. For more details, regional scientists well versed with the large scale models of recent origin such as Social Accounting Matrix Approach (SAM), and Computable General Equilibrium Models (CGE) must be consulted by the policy makers.

LIST OF TABLES/APPENDED TABLES

ANNEXURES

LIST OF FIGURES AND DIAGRAMS

Chapter 1

INTRODUCTION AND PROBLEM SETTING

1.1 Strategy of Regional Development in India

Balanced regional development as an important objective of Indian Planning Process, was first pronounced in the Second Industrial Policy Resolution of the year 1956. This Industrial Policy Resolution stated the followings:

"The face of industries in different parts of the country is very often determined by factors such as necessary raw materials or other natural resources. A concentration has also been due to the availability of power, water supply and transport facilities which have been developed there. It is one of the aims of national planning to ensure that these facilities are steadily made available to areas which are at present lagging behind industrially or where there is greater need for providing opportunity for employment provided the location is other wise suitable. Only by securing balanced and co-ordinated development of the industrial and agricultural economy in each region can the entire country attain higher standards of living" [1].

In view of the second industrial policy, heavy public sector plants of Iron and Steel, Engineering, Machine tools, Ship-building, Railway locomotives, Fertilizer, Electricity and Defence machinery were allocated to the backward regions of Orissa, Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh. Since then, the strategy of development of backward regions

has continued to be one of the objectives of various five year plans in India.

The third five year plan pronounced that "large scale industries, especially basic and heavy industries, across the regions frequently serve as a spearhead of intensive and broad based development" [2]. The plan felt that every region must have full opportunities of development based on locally available resources. All efforts were extended to develop agriculture, industry, transport, education and health etc. The plan aimed at self sufficiency in food grains production and expansion of basic industries like iron & steel, chemicals, fuels, power and machine building for more employment opportunity and reduction of regional disparity of income at faster rate.

The fourth five year plan required concrete steps to be taken to achieve industrial development. It postulated a strategy of multi dimensional area development with special emphasis on the backward regions. In order to remove regional disparities and to start area specific programmes, backward areas with unfavourable physiographic conditions and those having economic backwardness were identified. It accepted five criteria for the purpose of identification of industrially backward states and union territories, as recommended by the National Development Council in the year 1968.

These five criteria consisted of (i) total per capita income together with the contribution of mining and manufacturing, (ii) number of workers in factories per lakh of population, (iii) per capita annual consumption of electricity,

(iv) length of surfaced roads in relation to population and area of the state, and (v) Railway mileage in relation to population and area of a state (region).

The National Development Council (1969) appointed two working committees, one to identify industrially backward states and union territories on the basis of five criteria as stated in above and another to recommend financial incentives for starting up of industries in the backward areas [3].

The fourth plan viewed that removal of area imbalances should be taken up over a long period of time as it is an age old problem. The regions were directed to undertake special programmes for the development of Hill and Tribal areas. An important feature of the fourth plan was that it launched the "minimum needs programme" in order to narrow down the area disparities in infrastructure needs and income levels between social groups.

The fifth five year plan continued and even enlarged the measures introduced during the fourth plan. An inter-regional allocation policy in backward regions, an incentive policy in industrially underdeveloped states, a sub-plan approach for certain special problem areas and a social justice approach were the ingredients of the national level economic policy. Prominent special area programmes, such as, hill area development programme, tribal area development programme, and draught prone area development programme were introduced by the central government during this plan period. The main objective behind these programmes was to exploit the regional potentials so as to increase agricultural and allied sectors (horticulture,

plantations, bee keeping, and animal husbandry, etc.) production in the backward areas and improve the level of income of the special social groups. Commercial banks were instructed to extend concessional finances to promote these activities in the identified backward areas.

The sixth five year plan realized the need for balanced growth and the necessities to prepare various schemes for backward area development as part of general development. A high level National Committee for the Development of Backward Area (NCDBA) was constituted in the year 1980.

The sixth five year plan categorically stated that "the fact that there are vast areas of the country which have remained poor over the years is both a challenge and an opportunity" [4].

The plan attempted to achieve a balance between agriculture and industry sector. In this regard, efforts were made to encourage small scale, and khadi and village industries which depend upon agriculture sector for inputs and also other locally available resources. The Programmes of district industries centres and growth centres were introduced to step up production, income and employment in backward regions. In each state, backward districts were identified and industrial estates were set up to carry out diversified activities such that they are linked within the region. Long term finances at concessional rate of interest, by industrial development banks, were extended to the entrepreneurs in those

areas. Tax holidays were introduced for the initial five years of operation of the new industries in the backward areas.

On the other hand, the seventh plan for the first time slackened this objective and made only a stray reference to the industrial development of backward regions. According to the plan "the pattern of growth encouraged for the Seventh plan was expected to contribute towards the reduction of inter-regional disparities in levels of development". It was also for the first time that a plan heavily relied on the increase of agricultural productivity in order to raise agricultural incomes and reduce regional disparities of unemployment and poverty. In this regard, various area development programmes were introduced to reduce regional disparities of agricultural productivity.

Further, seventh plan envisaged a major programme of human resource development through primary health care, elementary education and elimination of illiteracy amongst young adults and greater emphasis on minimum needs programme such as water supply, rural roads and rural electrification. The planning commission anticipated that a substantial improvement in human resources in the backward regions would help in the reduction of the regional disparities.

Even today, in the era of economic reforms and stabilization measures in India, policy makers intend to continue special measures to induce industrial and agricultural development in the backward areas particularly eastern states of Orissa, Assam, Meghalaya and Manipur (Economic Survey of India, 1992-93) [5].

1.2 Dimensions of Regional Imbalance in India

Inspite of the forty years of the planned efforts and keeping the objective of balanced regional development in various five year plans, India, still presents a picture of glaring regional imbalances in terms of such indicators of economic growth as per capita income, proportion of population living below poverty line, percapita value added by manufacturing activities, developments in agriculture inputs of irrigation and fertilizer consumption, index of infrastructure development and so on.

Relatively speaking, some states such as Maharashtra, Gujarat, Punjab, Haryana, Tamil Nadu, Andhra Pradesh, and West Bengal in India are highly developed while the states of Orissa, Uttar Pradesh, Rajasthan, Bihar, Madhya Pradesh, and some eastern states comprising of more than 50 percent of total population are highly underdeveloped, agriculturally as well as industrially. The pitiable thing is that regional imbalance seems to be man made when we look at the most resource rich states of Orissa, Madhya Pradesh, Bihar and eastern state Assam. In fact, it would not be possible to gather all the indicators to show area imbalances due to the data problems. However, few important informations have been culled out from different sources to highlight the dimensions of regional imbalance in India. These data provided in the Table 1.1 are not uniform to same point of time for all the indicators but they may provide summary insights to us.

Table 1.1 : Index of Regional disparity in India.
(selected indicators)

Year	(a)*	(b)	(c)	(d)	(e)
1961	95	-	-	-	-
1967	-	-	-	-	241
1972	146	411	286	2621	-
1981	205	396	421	3896	179
1991	215	263	533	1672	159

* Notes: (a) denotes for index of disparity in real per-capita income and similarly, (b) for percapita net value added by manufacturing sector, (c) for intensity of irrigation, (d) for fertilizer consumption per hectare area, (e) for index of infrastructure development.

Firstly, the "index of disparity" in real percapita income has increased continuously from the year 1961 to the year 1991. The index worked out to be 95 in the year 1961 and increased to 146 in the year 1971. The same index increased sharply to 205 and 215 in the years 1981 and 1991, respectively [6].

Secondly, the index of area disparity in percapita net value added by manufacturing activity worked out to be 411 in the year 1971. It declined to 396 in the year 1981. For the year 1990, the index again declined but remained significantly at 263.

Thirdly, the index of disparity in irrigation worked out to be 286 in the year 1972 and it further widened to 421 and 533, respectively, in the years 1982 and 1990.

Fourthly, the index of regional disparity in fertilizer consumption per hector came to be very high, i.e 2621, in the year 1976 and increased further to 3896 in the year 1981 (see column 4, table 1.1). For the year 1991, the index declined yet remained sufficiently high at 1672. there has been high area inequality in fertilizer consumption per hectare.

Lastly, the index of area disparity in infrastructure sector was 241 in the year 1967 and it declined to 179 in the year 1981 (see column 5 in table 1.1). The same index declined again to 159 in the year 1992 and thus had shown reduction of this disparity to some extent. But the figure 159 in above is quite large and thus the fact is that the disparity in infrastructure has remained to be high in this country.

Besides, there were two more indicators of poverty, and dispersal of industries for which we have some informations from the source "Centre for Monitoring Indian Economy (CMIE), 1993" :

(i) there has been marked variation in the proportion of population living below poverty line in different states. In the year 1978, nearly, 52.7 per cent of the population of relatively poor states but 30.7 per cent of the population of the relatively rich states lived below poverty line. By 1989, the figures reduced to 36.3 and 16.0 for the relatively poor states and relatively rich states, respectively. During the period 1978 to 1989, poverty was reduced by 48 percent in the rich states but 31.3 percent in the poor states.

(ii) as far as industrial dispersal across the states is concerned, the first five leading industrial states accounted for 40 percent of all large factories, 55 percent of employment, 59 percent of the value of output and 56 percent of value added of the Indian economy, for the year 1989-90. These industrially developed states were Maharashtra, Tamil Nadu, Gujarat, West Bengal and Andhra Pradesh.

In the 1960s, the central level planners viewed, largely, that balanced regional development in the country could be attained through industrial development across the regions. Therefore, their strategy was to locate basic and heavy industries in the backward regions. It was believed that the basic and heavy industries would help in the further industrialization of the backward states. Particularly, it was believed that initiation of some giant public sectors in the minerally rich but economically very poor regions (states) would help many ancillary and related sectors to proliferate within the backward states and that could give big push to the backward regions for achieving faster rate of production, income, and employment.

However, by 1970s, people observed that the basic and heavy industries located in the backward regions (states) have benefit ed the concerned regions very little in terms of direct and indirect effects of output, income and employment. Because, the spread effects of these industries were very low. They failed to meet the regional demands. For instance, a steel plant located in a backward area mattered little to that area. Because the steel plant required highly skilled persons, engineers, technicians and managers. More skilled persons were brought from other developed states since they were not available from the backward state where the plant was located. Total wage paid to the unskilled workers available from the backward region was much less in comparison to the total wage paid to the skilled workers from outside the region. Therefore,

the steel plant mattered little in respect of employment and income for the concerned backward region. However, this was the story of direct effect.

With respect to the indirect effects, the steel plant did not meet the regional demand. They however met the external demand both overseas, and outside the region within the nation. Therefore, its forward linkage was not much significant for the backward state. With respect to backward linkages, the steel plant used most of the raw materials, except one i.e iron ore, brought from outside the concerned region. In other words, the steel plant had little technical and input dependence with other sectors of the backward region where it was located. Consequently, the indirect output, income, and employment effects of the steel plant were low.

When the direct and indirect effects were added together, people observed that the total income, and employment effects of the steel industry was less in comparison to other existing industries in the backward regions where the steel plant was located. Unfortunately, some of the existing and potentially effective industries of the backward region were sidelined because of the presence of public sector steel plant located in the backward region. In this regard, it is worthwhile to quote the comments of Janata Party government's sixth plan. It said our experience with large industrial project in backward areas shows that their spread effect are low and the surrounding areas continue to remain poor and under developed. In fact, such development by creating a dualistic economic structure may pose more problems than it solves [7].

An important failure of the national strategy of regional development in India has been the lack of clear cut understanding of the problems, potentials and structural constraints of the individual regions (or states). The regional development strategy in India can be viewed broadly as top-to-bottom level approach with the centre at the top and states at the bottom. There has been no fruitful strategy by the policy makers at the regional level in general and the backward regions in particular. It is often viewed that various programmes of regional development have been confined to the draft paper work rather than to the field work. For a more effective regional development strategy, a micro level regional strategy, with the states as the units, is a must. In view of above situations, the present study has been concerned with a highly under developed Orissa state of Indian Union. It is the third minerally rich state but the second poorest state of India. The structure of this poor economy has been studied in the framework of input-output methodology. Before getting into the details of the study, it is necessary to have an introductory outline of the basic economic conditions of this state. Because a review of basic economic statistics would not only help us in understanding of the problems of the concerned state but also the very objective of the present study.

1.3 Economic Profile of Orissa State

1.3.1 Economic Geography of the State

Orissa state is one of the oldest states of Indian Union. It was created as a separate province of Indian union way back

in the year 1936 by the then colonial British rulers of India. At present the state comprises of a geographical area of 156,000 square kilometre and a population size of 3.5 crore according to 1991 census. These figures are equivalent to in percentage terms 4.7 and 3.8 respectively of India as a whole. The size of state's income is however only 2.5 percent of the national income.

The state is situated in a favourable agro-climatic location of India. Its average rainfall index is 150 cm. A geographical map of this region has been provided at the end of this chapter. Nature has been kind and generous enough on its part in endowing this economically backward and poor region with vast amounts of several mineral resources, a number of rivers, sufficiently high amount of good crop quality soils and a substantial length of coastline among others. Annexure 1.1 provides some informations on the physiographic condition of Orissa state. Though a resource rich region, it has never been able to see off its very adjective "poorest of the poor states in India" over a lengthy period of sixty years of its separate statehood.

1.3.2 Growth of Orissa State's Income (Net State Domestic Product) at Constant 1970-71 Prices

A variety of economic programmes are implemented in the state since the inception of planning in India. How much the state is benefited can be evaluated only by knowing the change in net state domestic product (NSDP), and percapita income in real terms over the period. As such, planwise growth of real income (NSDP) and per capita income are two good indicators of

overall advancement of a state. The picture of planwise growth rates of real income of Orissa state has been provided in the Table 1.2 given below.

Table 1.2 : Plan-wise Growth rate of NSDP (Net State Domestic Product in Orissa)

Five year plans	Growth rate of NSDP in percent
1st plan (1950-51 to 1955-56)	3.15
2nd plan (1956-57 to 1960-61)	1.92
3rd plan (1961-62 to 1965-66)	3.82
Annual plan (1966-67)	7.97
Annual plan (1967-68)	(-)1.33
Annual plan (1968-69)	8.17
4th plan (1969-70 to 1973-74)	2.36
5th plan (1974-75 to 1977-78)	2.89
Annual plan (1978-79)	6.53
Annual plan (1979-80)	(-)16.15
6th plan (1980-81 1984-85)	3.88
7th plan (1985-86 to 1988-89)	5.89

Source: Statistical Abstract, Govt. of Orissa, 1991

The first five year plan in India was started from the year 1951-52 and it continued till the year 1955-56. During that period the growth rate of state income was achieved at 3.15 percent. The growth rate of state income declined to 1.92 percent during the second five year plan period 1956-57 to 1960-61. In the third five year plan covering the years 1961-62 to 1965-66, the growth rate of state income increased to 3.82 percent. Thereafter, three annual plans followed the third plan from 1966-67 to 1968-69. In the year 1966-67 the growth rate of state income achieved was fairly good at 7.97 percent. In the year 1967-68, there was severe draught condition in the state and the growth rate of state income was (-)1.33 percent. But in the subsequent year 1968-69 the state economy recovered to a positive growth rate of 8.17 percent. The fourth and fifth five

year plans which covered the periods 1969-70 to 1973-74 and 1974-75 to 1977-78, respectively, had growth rates of 2.36 percent and 2.89 percent. Then due to the change in the government the economic policy was reviewed and two further annual plans followed after the fifth five year plan. The growth rates during these two years 1978-79 and 1979-80 were 6.53 percent and (-) 16.15 percent respectively. The negative growth registered during 1979-80 was again due to the effect of severe draught condition in the state. The sixth five year plan period 1980-81 to 1984-85 recorded a moderate growth rate of 3.88 percent. The seventh five year plan was implemented from the year 1985-86. The state economy progressed well during the first four years of the seventh plan and achieved a growth rate of 5.89 percent.

1.3.3 Growth of Percapita Income

Growth rate of real percapita income at this state level in various five year plans have been provided in the Table 1.3 given below.

Table 1.3 Growth Rate of Per capita Income in Orissa

Five Year Plans	Growth Rate of NSDP in Percent
1st plan (1950-51 to 1955-56)	1.18
2nd plan (1956-57 to 1960-61)	0.12
3rd plan (1961-62 to 1965-66)	1.36
Annual plan (1966-67)	5.59
Annual plan (1967-68)	(-)3.46
Annual plan (1968-69)	5.88
4th plan (1969-70 to 1973-74)	0.23
5th plan (1974-75 to 1977-78)	0.92
Annual plan (1978-79)	4.73
Annual plan (1979-80)	(-)17.49
6th plan (1980-81 1984-85)	2.12
7th plan (1985-86 to 1988-89)	4.03

Source: Statistical Abstract, Govt. of Orissa, 1991

From this table, it is clear that the growth rate of per capita income in the state was positive in all the five year plans. But the figures in this respect were very marginal in magnitude in all the plans except the sixth and seventh five year plans. While the annual average growth rate of population was around 2.3 percent, the growth rate of percapita income was only around 1 percent from the first to the fifth five year plans. In the sixth five year plan, the growth rate of per capita income of 2.1 percent came for the first time close to the annual average population growth rate of 2.3 percent. The seventh five year plan recorded highest percapita income growth rate of 4.03 percent which was nearly double of the population growth rate 2.3 percent.

1.3.4 Structure of Orissa Economy

The structure of the Orissa economy has had no major change or shift in its economy. Primary sector in general and agriculture sector in particular continue to dominate the Orissa economy. The Table 1.4 depicts the structure of Orissa economy in view of broad sectors such as primary, secondary, and tertiary sectors.

It can be seen from the table that in 1950-51, primary sector had the share of 75 percent in the state's income (NSDP) at constant prices. This figure stood at 65.1 and 61.5 percents for the year 1983-84 and 1988-89 respectively. Over a long period of thirty nine years, there has been a marginal decline of 14 percent in the primary sector's share in the state income.

Table 1.4 : Percentage distribution of NSDD of Orissa at factor cost by Broad sector (1970-71 prices)

Sectors	Years			
	1950-51	1960-61	1983-84	1988-89
Agriculture	70.7	64.0	59.8	56.6
Forestry	1.5	1.0	1.7	1.2
Fishing	2.4	0.4	1.4	1.4
Mining & Quarrying	0.7	1.6	2.8	2.3
(1) PRIMARY TOTAL	75.3	67.0	65.1	61.5
Manufacturing (Registered)	1.4	2.0	5.3	5.9
Manufacturing (Unregistered)	3.1	3.7	2.3	1.7
Construction	0.8	3.7	2.5	1.6
Electricity, Gas & Water Supply	0.2	0.1	1.6	0.6
(2) SECONDARY TOTAL	5.5	9.5	11.7	9.8
Railways	0.9	1.3	0.8	1.7
Road Transport & Storage	0.9	1.0	1.3	2.1
Communication (Post & Telegraph)	0.2	0.3	0.4	0.7
Trade, Hotel & Restaurant, Tourism	4.6	6.9	7.8	7.4
Bank & Insurance, and public services	12.6	14.0	12.9	16.8
(3) TERTIARY TOTAL	19.4	23.5	23.2	28.7
TOTAL (1+2+3)	100.0	100.0	100.0	100.0

Source : Statistical Abstract, Directorate of Economics and Statistics, Government of Orissa, 1990-91

The agriculture sector in particular accounted for 70.7 percent, 59.8 percent and 56.6 percent of the state income respectively for the years 1950-51, 1983-84 and 1988-89. Secondary sector had 5.55 percent, 11.7 percent and 9.8 percent of the state's income for the years 1950-51, 1983-84 and 1988-89. The percentage share of the secondary sector in the state's income in the year 1988-90 was nearly doubled in comparison to the year 1950-51. However, this doubled figure would not make us optimistic of the secondary sector's performance when we shift the reference year to the year 1960-61. Because, the Orissa state availed of some central level heavy projects such as Iron and steel plant and fertilizer plant in the late fifties and the production of these plants started by early 1960s. The share of secondary sector in the state's income was 9.5 percent in the year 1960-61. Therefore, it shows a complete stagnation of the industrial sector upto 1983-84. An important observation is that the share of unregistered manufacturing sector in the state's income has declined from 3.6 percent in the year 1950-51 to a mere 1.6 percent in the year 1988-89. It indicates that the unregistered manufacturing sector has been thoroughly marginalised over the thirty nine years of planning in the state. Further, the growth of registered manufacturing sector owing to the policy of heavy industrialization has not helped the growth of the unregistered manufacturing sector.

Tertiary sector contributed 19.2 percent, 23.2 percent and 28.7 percent to the state's income in the year 1950-51, 1983-84 and 1988-89 respectively. Trade, tourism and hotels sector is

the largest sub sector in the tertiary sector with respect to the contribution to the state income. The basic infrastructure activities of railways, posts and communication, transport services other than railways and banking and insurances sectors have shown stagnant performances in this state for the past thirty nine years.

1.3.5 Employment

The size of main workers in the Orissa State is around 33 percent of the total population of the state,according to the Census of Population (1991). Marginal workers accounts for another 6 percent of the total population of the state. Thus total workers account for around 39 percent of the total population of the state.

Employment in the organized sector is merely 3 percent of the total workforce. Public sector again absorbs more than 85 percent of the total workers engaged in the organized sector. Thus, the private organized manufacturing sector is almost insignificant with respect to employment. These facts also indicate the industrial backwardness in respect of the occupational structure of the workers in the Orissa State.

There has not been much change in the proportions of workers engaged in the broad sectors like primary, secondary and tertiary sectors. Table 1.6 gives us the percentage distribution of total workers in broad sectors in Orissa State.

Table 1.5 : Occupational Distribution of Workers in Broad Sectors of Orissa (in percentage terms)

State	Census Years 1971	1981	1991
Primary	81.00	77.10	74.64
Secondary	6.12	7.76	7.71
Tertiary	12.88	15.14	17.68
Total	100.00	100.00	100.00

Source : Manpower, DES, Govt. of Orissa, 1992

The primary sector accounted for 81 percent, 77.10 percent and 74.64 percent of the total workers in the state according to three Census years 1971, 1981 and 1991 respectively. The secondary sector employed only around 7.7 percent of the total workers in the economy. Infact, there was a marginal decline in the employment of the secondary sector in the census year 1991 over the previous census year 1981. Tertiary sector consisting of public administration, banks, railways and posts etc., mostly under the public sector, had shown continuous increase but marginal in magnitude in employment in all the three census years.

About unemployment, officially it has been projected that by the end of the eighth five year plan 1995, there would be 6.5 lakh persons as educated unemployment out of the total 18 lakh job seekers. Given the current state of conditions of industries and the government sector, the educated unemployment would be equal to 36 percent of the total workers and 70 percent of the total educated workers seeking jobs (Economic Survey of Orissa, 1992).

1.3.6 Poverty

Annexure 1.2, provides informations about the percentage of population living below poverty line in various states of India for three years 1972, 1977, and 1988.

From this Annexure 1.2, it can be seen that Orissa state secured the status of poorest of the poor states of India because of high percentage i.e 68.6, of its population living below poverty line in the year 1970-71. By the year 1977, this figure marginally declined to 67.9 yet this high figure placed Orissa state with the same status of poorest state in India. The percentage of population below poverty line in Orissa state declined by 20.3 percentage points from the figure in the year 1972 to the figure 48.3 in the year 1988. Still, it was able to maintain its status of poorest state of India. It may be noted that the figures described here are based on official statistics. In India, several researchers have not accepted the government estimates on poverty. A study by Lakadwala (1989) has placed the Orissa state with 55 percent of population living below poverty line for the year 1988. Whatever the debate may be, it is a fact the Orissa state still continues with high poverty pockets.

1.3.7 Percapita Consumption Expenditure

The consumption expenditures of rural and urban people also reflect on the degree of development of a region. The pattern of consumption expenditure between the broad items of food and non food types indicates the standard of living of the people. In this regard Table 1.7 outlines the structural

composition consumption in terms of food and non-food items, in percentage terms based on National Sample Survey (NSS) data.

Table 1.6 : Percapita Consumption of Food and Non-food Items (Figures in percentage terms)

Year	NSS Round	Rural		Urban	
		Food	Non-food	Food	Non-food
1963-64	18th	75.32	24.68	64.71	35.29
1967-68	23rd	79.37	20.33	70.28	29.72
1973-74	28th	75.74	24.26	67.57	32.43
1977-78	32nd	71.41	28.59	66.02	33.98
1983-84	38th	73.64	26.36	65.31	34.69

Source : National Sample Survey Reports, Govt. of India, New Delhi.

The rural food and non-food consumption respectively, comprised of 75.32 percent, and 24.68 percent of their total consumption expenditure in the year 1963-64. These figures of food and non-food consumption respectively, stood at 71.41 and 28.69 in the year 1977-78. For the year 1983-84, these figures were 73.64 and 26.36 respectively, for rural food and non-food consumption items.

The urban food and non-food consumption expenditure constituted 64.71 percent and 35.29 percent of their total consumption expenditure. For the year 1977-78, the urban food consumption expenditure increased to 66.02 percent but the non-food consumption expenditure declined to 34.69 percent of the total consumption. By the year 1983-84, the percentage figures of urban food and non-food consumption expenditure were respectively, at 65.31 and 34.69.

The percentage break up of the total consumption expenditure into food and non-food consumption expenditure of the

rural and urban areas had shown two common features: first, the propensity to consume of food items had increased during 1963-64 to 1973-74 but the propensity to consume of non-food items had declined during the same period in both the cases of rural and urban areas. Thereafter the expenses on the food items had declined but the non-food items increased during 1973-74 to 1983-84. But the structural composition of consumption expenditure (in percentage terms) such as food and non-food expenses had no major change in the Orissa economy. The non-food items shared on an average one fourth of the total consumption expenses. The lower share of non-food items in total consumption can be perceived as one of the important factor of underdevelopment of the Orissa state.

1.3.8 Infrastructure Developments in the Orissa State

Infrastructure is a crucial input for the economic development of a region. It comprises of infrastructures related to the agriculture and its allied sectors as well as the infrastructures related to industry sector. In this regard, some important indicators of infrastructure developments have been summarized in the followings:

(a) Index of infrastructure sector in Orissa State

According to CMIE,1993, Orissa state secured fourteenth rank in comparison to other states of India in terms of overall infrastructure development in the year 1966-67. For the year 1989-90 the Orissa state's rank declined to 15. Over a long period of twenty three years, instead of an improvement, there was pitiably a deterioration in the index of relative infrastructure development in the Orissa state. Further, Orissa

state secures eleventh rank in terms of the size of population in comparison to other states of India. Thus, there is a marked discrepancy between the size of population and infrastructure development.

(b) Railway route length in kilometers in the Orissa state accounted for 3.11 percent and 3.20 percent of the total figures of India in the years 1971-72 and 1992-93 respectively. The ranks of Orissa state in comparison to other states were 14 and 13 for the above two years respectively (CMIE, 1993).

(c) In case of roadways, Orissa accounted for 5.6, 7.72, and 11, all in percentage terms, of India's figures for the years 1971-72, 1981-82 and 1987-88 respectively. In terms of ranks the figures were 11, 14 and 16 for the above three years for the Orissa state (CMIE,1993).

(d) For surfaced roadways, Orissa accounted for 18.9 percent, 14 percent and 9.7 percent of India's figure in the above three years. In terms of ranks the figures were 18, 22 and 24 for Orissa for the above years respectively (CMIE,1993).

(e) Energy Sector

The percentage shares of Orissa's power generation, in million killowatt per hour, to that of all India figures were 4.08, 2.83 and 1.73 for the years 1970-71, 1980-81 and 1992-93 respectively. The rank figures for Orissa in this regard were 10, 13 and 12 for these three years. Further, there were no marked improvements in the plant load factor over the years in Orissa. It was 35.2 in the year 1982-83 and 35.6 in the year 1993-94 (CMIE,1994).

(f) Banking Sector

The government of India nationalized the banking sector in the year 1969. The purpose was to mobilize the financial resources on a large scale and provide adequate financial capital to the priority sectors in the poor regions. Unfortunately, the social goal of banking sector has been quite discriminatory across the regions/states. The two important indicators of banking sector performance include such as credit deposit ratios and priority sector lendings. The data on these two indicators across the regions in the years 1969, 1980 and 1994 have been presented in the Annexure 1.3. In 1969, Southern states of Andhra Pradesh, Tamil Nadu, Karnataka, Kerala and Maharashtra had the credit deposit ratio figures of 100.8, 133.5, 76.1, 65.8 and 100.9 respectively. The populous North and North-Eastern states of Uttar Pradesh, Rajasthan, Bihar, Orissa and Assam had the credit deposit ratio figures of 45.7, 51.4, 30.8, 51.7 and 39.4 respectively, for the year 1969. This discrepancy across the regions also continued for other years. It states that the banking and insurance sectors had diverted the funds collected through deposits from the North and North-Eastern states towards the Southern states even though the Northern and North-Eastern states were having vast amounts of natural resources needed for industrial and agricultural development.

With respect to the priority sector lendings, Orissa state shared only 0.3 percent of the total priority sector lending of the nation extended by the banking and insurance sector in

1969. It increased to 1.78 percent by 1980 and 2.3 percent by 1992.

Similarly, industrial development banks (Development Financial Institutions) had favoured the regional bias as outlined in the above. Orissa state had the share of 2.2% and 2.1% of the total disbursement of funds in India by the DFIs for the year 1980-81 and 1991-92 respectively.

1.3.9 Mineral Reserves in Orissa

Orissa state comfortably leads in seven mineral resources. The following Table gives a comparative picture of mineral reserves between Orissa and India.

Table 1.7 : Major Mineral Reserves in Orissa State (Quantity in million tonnes), 1994

Minerals	(a) Orissa	(b) India	(a) as % to (b)	Rank
Coal	46527	196892	24	2nd
Iron ore	2602	11977	22	2nd
Manganese	41	177	23	2nd
Lime stone	1212	76446	2	9th
Chromite	86	88	98	1st
Dolomite	1171	4967	24	1st
Bauxite	1442	2525	57	1st

Source : Directorate of Mines, Govt. of Orissa, 1994

The state occupies number one position in terms of chromite ores with 97.72 per cent, Dolomite with 23.58 percent and Bauxite with 57.11 percent and second largest position in terms of Coal with 23.6 percent, Iron ore with 22 percent and manganeze with 23.16 percent of each of the national total reserves. The state also occupies ninth position in terms of Lime stone reserves.

1.3.10 Condition of Agriculture Sector in Orissa

In this section some of the important characteristics of Orissa state's agriculture sector such as crop-wise concentration of cultivable land, input intensity in regards of fertilizer, irrigation and modern agro-equipments have been summarized. Such a summary view may reflect on the condition of agriculture sector of this poor state.

(i) Crop-wise concentration of cultivable land in Orissa

Table 1.8 given below presents data on cultivable land allocated to various crops, such as cereals, pulses, fibres, spices, and other fruits and vegetables along with details of specific products within each of these broad crops.

Table 1.8 : Area Under Different Crops in Orissa, Year 1989-90.

Sl. No	Crops	Area (00 hectares)	Percent to Total Area Under Cultivation
1	cereals	49583	59.31
(i)	rice	43915	52.53
(ii)	wheat	877	1.05
(ii)	others	4791	5.73
2	Pulses	20133	24.08
Food total(1+2)		69716	83.39
3	oilseeds	11271	13.48
(i)	groundnut	3714	4.44
(ii)	sesamum	3354	4.01
(iii)	mustard	1411	1.69
(iv)	others	2792	3.34
4	fibres	851	1.02
(i)	cotton	78	0.02
(ii)	jute	297	0.36
(iii)	others	476	0.57
5	spices	1028	1.23
6	vegetable		0.7
grand total		83606*	100

Source: Statistical Abstract,1991, Govt. of Orissa.

The size of land under cultivation accounts for 47 percent of geographical area of the state. Forest cover shares 30 percent while the remaining 3 percent is the share of others. From the table in above, it can be seen that the major portion i.e 83.4 percent, of the area under crops goes to food crops but only 16.6 percent to non-food crops. Within food crops, cereals accounts for high amount of 59.3 percent and pulses only 24.08 percent of Orissa state's gross area under crops. Further, within the cereal crops, the rice crop forms the single largest crop by absorbing as high as 52.5 percent of the state's gross cropped area.

In view of commercial crops such as oilseeds, fibre and spices, the state puts 13.5 percent of gross cropped area to oilseeds, very low amount i.e 1.02 percent to fibres, and 1.41 percent to spices, tobacco, and condiments. Vegetables account for a mere 0.7 percent of the gross cropped area.

Crop-wise composition of agriculture sector's output in Orissa

Table 1.9 gives the crop-wise composition of output of the agriculture sector in the Orissa state in the year 1983-84. From this Table 1.9, it can be seen that the cereal crops shared the largest portion i.e. 46 percent of total value of agriculture sector's output in the year 1983-84. Among the cereals, rice could share 41 percent of gross output of the agriculture sector in the same year. Pulses, oil seeds, fibres, spices, and vegetables contributed, respectively, 12 percent, 10 percent, 6 percent, 4 percent, and 17 percent to total value of gross output of the agriculture sector. The remaining contribution of 10 percent went to other minor crops.

Table 1.9 : Percentage distribution of cropwise value of output of agriculture sector of Orissa state, in the year 1983-84.

Crops	Percentage Distribution
(1) Cereals	46
(i) rice	41
(ii) other cereals	5
(2) Pulses	12
(i) moong	6
(ii) urad	3
(3) Oil Seeds	10
(i) ground nut	4
(ii) sesamum	2
(iii)others	4
(4) Fibres	6
(i) sugar cane	5
(ii) other	1
(5) Spices	4
(6) Vegetables	17
(7) Miscellaneous	10

Source : Directorate of Agriculture, Govt. of Orissa

(iii) Fertilizer Consumption in agriculture sector of Orissa

The data on quantity of fertiliser used per hectare in Orissa state in four years 1975, 1981, 1986 and 1992 have been presented in Table 1.10. For comparison purpose, the figures corresponding to all India level, and the most advanced Punjab state have been included in the Table 1.10.

Table 1.10 : Fertilizer Consumption per hectare in Orissa

	Quantity in kg			
Year	Orissa	India	Punjab	Orissa's Rank
1975	6.5	17.1	51.7	17
1981	9.6	31.9	111.9	17
1986	14.7	48.4	157.4	17
1992	21.1	70.3	168.4	18

Source : CMIE, Basic Statistics for states, 1993

From this table, it may be clear that the fertilizer consumption per hectare in orissa state i.e 6.5 kilogram was just one third of all India average figure but one eighth of Punjab state's figure in 1976. By 1992, its consumption of fertilizer per hectare increased to 21.1 kilogram which is equivalently one third of all India figure. However, in comparison to Punjab state there could not be any change. The overall ranks also indicated that its rank position has remained almost the same. Thus in terms of fertilizer input intensity of agriculture sector, Orissa state is one of the lowest state in India.

(iv) Irrigation

The data on percentage of gross irrigated area to the gross cropped area have been presented in the Table 1.11 given below.

Table 1.11 : Percentage of Gross Irrigated Area to Gross Cropped Area in the Orissa.

Year	Orissa	India	Punjab	Orissa state's rank
1971	17.0	23.3	76.5	15
1981	22.9	29.1	86.1	13
1990	25.3	32.9	93.6	10

Source : CMIE, Basic Statistics, states, 1993

The informations on irrigation input as provided in the table above indicates that the level of irrigation facility is also in a very poor condition. Around one sixth of gross cropped area was under irrigation in the Orissa state in the year 1971. It improved to one fourth of cropped area under irrigation by the year 1991. In this regard, Orissa state's

figure in the year 1971 was 40 percent behind all India level, but as large as 550 percent behind the Punjab state. By the year 1990, the gap between Orissa and India was reduced to 33 percent. But in comparison to Punjab state, it was behind with a high gap of 236 percent.

(v) Mechanization

The degree of mechanization of agriculture sector is perhaps the lowest in India. In 1975, number of tractors used was only 1441 and this was equivalent to 0.39 percent of all India figure. By 1992, it has increased its number of tractors to 12,116 which is 1 percent of all India figure. However, it is not known whether these tractors are purchased by farmers and used in agriculture sector. As our experience shows, in many states, tractors are purchased by state government and used , largely, as a means of transporting sewages to outskirts of the city.

1.3.11 Industrial Development in Orissa State

As pointed out earlier, industrialization of backward regions, particularly minerally rich but economically poor states of the country, has been one of the aims of national level planning process in India. In this regard, the present section provides an outlook on the principal characteristics of industry sector of Orissa state. However, it may be noted that data were not available for important indicators of industrial development for a number of years at the Orissa state level. Accordingly, we have some indicators pertaining to the year 1983-84, the only year for which detailed data are available.

Also, few indicators of industrial development of Orissa state have been visualized in relation to national level and other states of India on the basis of informations derived from the source CMIE (1993).

(i) Principal Characteristics of Industrial sector of Orissa

Informations about the number of registered factories, their employment, and gross output in major sectors of Orissa state have been summarized in the Table 1.12 given below.

Table 1.12 : Number of Registered Factories in Orissa state, in the year 1983-84.

Sectors	Number of Factories	% to Total	No.of Persons Employed	% to Total	Output Rs Cr.	% Total
Food	189	13.0	4209	3.0	6067	4.0
Tobacco	58	4.0	229	0.7	812	0.7
Wood	384	26.0	3727	3.0	1228	1.0
Cotton	29	2.0	6568	5.0	3879	3.0
Paper	39	2.6	9782	7.0	6558	5.0
Alloys	22	1.5	31319	22.5	37129	26.2
Metal	46	3.0	1460	1.5	683	0.5
Machinery	75	5.0	640	0.5	749	0.6
Electricity	38	2.5	36477	26.3	12641	9.0
Others	605	40.4	43801	31.0	69623	50.4
Total	1485	100.0	138912	100.0	139396	100.0

Source : Annual Survey of Industries, C.S.O., 1983-84

From the table, it can be seen that there were a good number of factories in the food, and wood sectors which shared respectively, 26 percent and 13 percent of the total number of the registered factories in Orissa state. However, in case of employment, and output, the share of food sector in factory sector total employment, and total output were respectively 3

percent and 4 percent. The Wood sector shared 3 percent of factory sector employment but only 1 percent of factory sector output of Orissa state. Another observation about the food, and wood sectors was that they were largely dominated, by two main activities such as rice milling and other grain milling in case of food sector, and saw milling in case of wood sector. In case of the food sector, rice milling accounted for 165 factories out of total 189 factories. The contribution to employment, and output by rice milling was respectively 80 percent, and 85 percent of total of employment, and output of food sector. Similarly, in case of the wood sector, saw milling captured 352 factories out of total 384 factories in that sector. In terms of employment, and output, the saw milling activities accounted for 79 percent, and 70 percent of total employment, and output of wood sector.

Cotton textiles and paper sector shared respectively, 2 percent and 2.6 percent of total registered factories of the Orissa state. Contribution to factory sector employment by cotton sector was 5 percent and 7 percent by the paper sector. In terms of size of output, cotton sector accounted for 3 percent and paper sector 5 percent of total output of the factory sector in the state.

Metal alloys, including iron & steel, and aluminium, shared only 1.5 percent of total number of registered factories in the Orissa state. But they employed 22.5 percent of total persons employed in the factory sector. In terms of size of output, their constituted 26.5 percent of total output of the factory sector in the Orissa state. Machinery sector shared 5

percent of total factories, but only 0.5 percent of factory sector's employment and 0.5 percent of factory sector's output of Orissa state. Electricity sector including electricity generation and distribution shared 2.5 percent of total number of factories but as high as 26.3 percent of employment, and 9 percent of output of factory sector of Orissa state.

Finally, all the factories in major sectors as mentioned above, accounted for 61 percent of total number of factories, 69 percent of factory sector's employment, and 50 percent of factory sector's output of Orissa state.

(ii) Industry sector in Orissa vs India

For a comparative view of industrialization of Orissa state in relation to all India, and other state, we have only informations about the number of factories as percentage to all India figure, and value of output by manufacturing sector which were available from the from CMIE (1993) for three years 1971, 1981, and 1989. On the basis of informations available from above source, it was possible to indicate the rank position of Orissa state in comparison to other states of India. These two information as mentioned in above have been provided in Table 1.13 given below.

Table 1.13 : Orissa vs India: Number of Factories

Year	Factories in Orissa % to all India	Rank	Output % to India.	Rank
1971	1.8	14	1.7	14
1981	1.6	14	1.7	15
1989	1.4	15	1.7	15

Source, CMIE (1993) Basic Statistics for States, Bombay

From above data in Table 1.13, the percentage share of Orissa state to all India in regards of total number of registered factories has declined from the figure 1.8 in the year 1971 to 1.6 in the year 1981 and 1.4 in the year in 1989. In terms of rank position in comparison to other states, it has deteriorated to 15th position in 1989 from 14th position in 1971. Therefore, it may be concluded that there has not been much relative change in the industrial development of Orissa state over the years. Secondly, it may be noted that Orissa is one of the top five leading sectors in terms of mineral resources and poorest of the poor states. At the same time, on the basis of its poor rank 14 or 15 in terms of number of industries and value of industrial output, it seems that neither mineral resources nor its high poverty has been seriously considered for industrialization of the Orissa state. This shows the planner's reckless attitude to regional development in case of backward states in India.

1.4 Objectives of the Study

Besides the argument of low spread effects of heavy projects and inefficient resource allocation mechanism at the national level, many economists and policy makers have argued that the regions themselves were also responsible for their under development (Kashyap, 1979). "Although the plan formulation at the central level has attained high level of sophistication, the same at the state levels is not even rudimentary (Meheta, 1983). Barring few states of Punjab, Haryana, Gujarat and Maharashtra, sub-national plan formulation

continues to be neglected area of planning. Infact, the known techniques of regional science have not even begun to be used in the backward regions. Planning at the regional level is, moreover, an adhoc exercise conducted by the bureaucrats and void of a comprehensive and consistent technical framework.

In view of above, it seems that a necessary step to both regional and inter-regional analysis would be that a detailed mapping of production structures at the regional level be undertaken. In this regard, one extremely use of way of bridging the information gap at the regional level is to organize the information base into a Leontief type inter-industry model. Such a quantitative framework apart from serving as a device for storing and displaying informations, can provide a powerful analytical tool for structural analysis and planning exercises. Further, such a model could also facilitate a region if it intends to have a broad based model, which also take input-output as one of the core model, like Social Accounting Matrix (SAM) or Computable General Equilibrium Model (CGE) which have been gaining prominence now a days and have been found to be most suitable for modelling the strategy of regional development. However, such models require large scale data which could not be possible for an individual researcher.

In this context, in 1970s, there appeared many regional economic studies, particularly, in the input-output framework in order to facilitate the planning process at the regional levels. These regional input-output studies argued that among all class of economic models, input-output type models are

better ones to guide the regional planners at the detailed sectoral level for achieving maximum income, and employment. Unfortunately, Orissa, the most under developed state, has had no such study till date. There is no analytical base for the planners of this state.

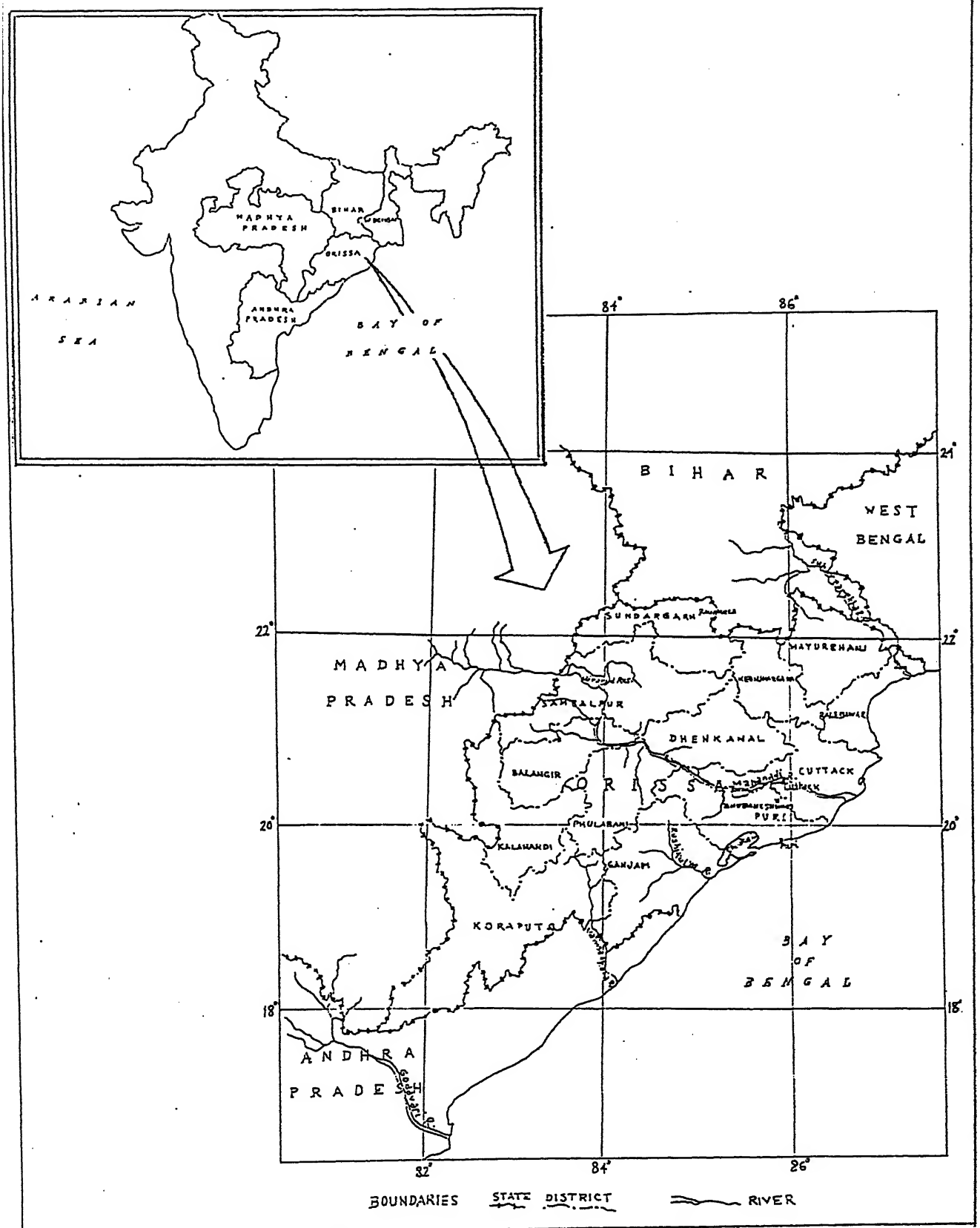
In view of the above background, the main objective of the present study has been to prepare the input-output tables and carry out the study of the structure of the Orissa state of India. The two core input-output tables relating to the interindustry transactions and the capital coefficients of this study have been based upon the past data and under certain assumptions, as usual to an input-output study, they may be useful for several objectives:

First, the Orissa state is characterized with high poverty, unemployment, and low level of standard of living of the people. Among several determinants, low level of output, income, and employment are the three most important macro determinants of poverty, unemployment, and low level of living of the people. For any successful strategy of development, sectoral planning is very much required in order to step up the level of production, income, and employment. This require to know the output, income, and employment effects of various producing sectors. Therefore, our empirical objective is to estimate and analyze different types of output, income, and employment multipliers by using the estimated input-output tables for the Orissa state.

Secondly, it is believed that the present study may stimulate the researchers and policy makers of this region to have a technical framework behind the plan formulation in the future. It is believed that the study may enthuse researchers to create a data base for the current period in order to prepare new input-output tables based on the current data. Sectoral budget allocation may be made through the assessments of importance of the sectors on the basis of current input-output informations and parameters.

Thirdly, these tables may form the base study for evaluating the concerned state's socio-economic achievements of the past and future periods. Also, in the absence of much technical change, these base tables may directly facilitate the policy decisions at the state level.

Fourthly, national and regional level policy makers are, often, remarked, by the private sectors, for the inadequate fiscal and other economic policies and incentives such as tax rebates, infrastructure facilities, and financial capital assistance at concessional rate of interest from the public sector banks to the growth oriented, and employment intensive industries. It may be needed to identify the important sectors which have over the years attained comparatively more growth and employment opportunities. For this purpose we need to know about sectoral output, income and employment effects of various sectors. This, in turn, may be possible by using a past input-output model in the absence of any perceptible technical change. If technical changes occur, two input-output tables of which one pertaining to the base year table prepared by this


MADHYA PRADESH
BIHAR
ORISSA
ANDHRA PRADESH
ARABIAN SEA
BAY OF BENGAL
84°
86°
21°
22°
20°
18°
BIHAR
WEST BENGAL
SUNDARGARH
MAYURBHANJ
MADHYA PRADESH
SAMBALPUR
DHENKANAL
BALANGIR
CUTTACK
ORISSA
PURI
PHULABANI
KALAHANDI
GANJAM
KORAPUT
BAY OF BENGAL
ANDHRA PRADESH
82°
84°
86°
BOUNDARIES
STATE
DISTRICT
RIVER

ANNEXURE-1.1 PYHSIOGRAPHIC STATISTICS OF ORISSA STATE

1. LOCATION: 21.10 N 85.00 E EASTERN COAST OF INDIA, AREA : 155707 sq km.
CAPITAL CITY: BHUBANESWAR(CITY OF TEMPLES)
AIRPORT: BHUBANESWAR.

2. STRUCTURE: PENINSULAR BLOCK

3.NATURAL VEGETATION: MOIST TROPICAL (DECIDUOS, EVERGREEN)

4. MEAN TEMPERATURE

MONTH	MINIMUM	MAXIMUM
JANUARY	20.0	25.0
APRIL	30.0	32.5
JULY	27.5	30.0
OCTOBER	25.0	27.5

5. NORMAL RAINFAL (ANNUAL AVERAGE) 150cm
6. GEOLOGY : DHARWARIAN, CHARNOCKITES, PLIESTOCENE
7.LAND USE : FOREST(30 PERCENT) , CULTIVATION(47 PERCENT) OTHERS (23 PERCENT)
8. MAJOR MINERALS : IRON ORE, MANGANESE, COAL, BAUXITE, CHROMITE.
9.MAJOR CROPS: RICE, MAIZE, GROUNDNUT, SEASAMUM, TOBACCO, JUTE.
10. SOILS : RED LOOMS, LATERITE, COASTAL ALLUVIUM
11.FAMOUS PLACES:
(i) CHILIKA- the largest salt water lake in ASIA
(ii) EKAMRA KANAN : the largest rose garden in ASIA.
(iii) SUN TEMPLE at KONARK - famous attraction for foreigners.
(iv) NANDAN KANAN : ZOO
(v) CHANDIPUR SEA - site for Tessting Missiles(AGNI)
(vi) PURI - Lord JAGANNATH- one among the four great GOD in India.
12. WORST KNOWN FOR: KALAHANDI (where people die of hunger & malnutrition, diseases)
13. population size : 3 crore
14. DENSITY OF POPULATION : 202
15. MAIN ACTIVITY: AGRICULTURE
16. WORK FORCE: 39 PERCENT OF POPULATION
17. LITERACY : 36 PERCENT.
18. RIVERS: MAHANADI, BAITARANI, SALANDI, SUBARNA REKHA, RUSIKULYA, KATHJODI.
19. COAST LINE : 480 kmtr.
20. MAJOR PUBLIC SECTOR: IRON & STEEL PLANT(ROURKELLA), FERTLISER PLANT(PARADEEP)
MIG 29 FACTORY(KORAPUT), RAILWAY WAGONS FACTORY(BBSR)
DEFENCE ACTIVITY: CHANDIPUR SEA.

ANNEXURE 1.2 : POVERTY

Sl.No.	STATE	Percentage of population below poverty line	
		1972-73 (Revised)	1977-78 (Revised)
1	Andhra Pradesh	54.9	43.6
2	Assam	47.0	47.3
3	Bihar	54.5	56.3
4	Gujarat	41.1	38.9
5	Hariyana	23.1	25.2
6	Himachal Pradesh	15.1	27.0
7	Jammu and Kashmir	39.0	33.4
8	Karnataka	50.5	50.8
9	Kerala	56.9	48.4
10	Madhya Pradesh	58.6	58.9
11	Maharashtra	47.7	50.6
12	Manipur	24.7	28.7
13	Meghalaya	19.0	47.4
14	Orissa	68.6	65.1
15	Punjab	21.5	16.4
16	Rajasthan	46.0	33.6
17	Tamil Nadu	59.7	52.8
18	Tripura	39.9	60.5
19	Uttar Pradesh	52.8	49.7
20	West Bengal	56.5	52.2
21	All UTs, Nagaland and Sikkim	30.2	21.1
22	All India	51.1	48.3

Source : Planning Commission, Govt. of India

exture 1•3 Banking Statistics

(a) Credit Deposit Ratio

tes/year	1969(June)	1980(June)	1994(March)
	100.80	70.40	73.30
am	39.40	39.40	41.80
ar	30.80	41.40	34.70
arat	48.60	51.70	46.30
yana	46.90	65.80	50.10
nataka	76.10	78.70	72.70
ala	65.80	68.30	41.40
	58.90	51.40	55.40
arashtra	100.90	77.30	69.90
ssa	51.70	56.70	59.90
jab	27.00	38.50	42.00
sthan	51.40	67.10	50.00
il Nadu	133.50	90.00	87.00
ar Pradesh	45.70	43.00	36.80
t Bengal	115.40	60.40	45.60

(b) Priority Sector Lending in major states of Indian Union

tes/year	1969 Rs.Crore	1980 Rs.Crore	1992 Rs.Crore	1969 In %	1992 In %
India	442.00	7906.00	44645.00	100.00	100.00
	30.00	698.00	4034.00	12.70	12.00
am	1.00	75.00	552.00	0.20	1.40
ar	5.00	352.00	2153.00	1.30	4.90
arat	31.00	593.00	2779.00	8.80	6.20
yana	7.00	309.00	1450.00	2.40	4.00
nataka	35.00	602.00	3279.00	9.60	9.10
ala	21.00	335.00	1652.00	3.40	4.20
	14.00	351.00	2639.00	2.60	6.30
arashtra	115.00	1085.00	5584.00	17.10	8.80
ssa	2.00	141.00	1050.00	0.30	2.40
jab	14.00	423.00	2587.00	2.30	6.40
astan	6.00	174.00	2996.00	2.40	5.00
il Nadu	79.00	1328.00	4807.00	16.40	10.90
ar Pradesh	26.00	858.00	4814.00	10.70	11.50
t Bengal	23.00	473.00	2663.00	2.40	4.10

continued

(c) Assistance Disbursed by All India Financial Institutions -Share in total (percentage)

States/year	1980-81	1991-92
A.P	5.90	10.00
Assam	0.00	0.90
Bihar	2.00	2.20
Gujarat	11.90	11.50
Haryana	2.20	2.40
Karnataka	8.90	4.80
Kerala	3.20	1.80
M.P	3.10	4.70
Maharashtra	22.30	27.00
Orissa	2.20	2.10
Punjab	3.50	2.30
Rajasthan	5.40	3.80
Tamil Nadu	10.80	8.20
Uttar Pradesh	7.60	7.40
West Bengal	6.30	3.40

Source : "Basic Statistics relating to the States" Centre for monitering Indian Economy ,1994

which an economy is characterized by a single producing unit. Commodities are produced for the market and it is the size of the market that determines the level of economic activities such as output, employment, and income. The size of the market in a Keynesian model is nothing but the aggregate effective demand that consists of aggregate consumption by households, government expenditure, investment and net exports. A Keynesian economist would say that unless the size of aggregate demand changes, there would be no change in the level of output, employment, and income of an economy. But an input-output analyst may differ from a Keynesian economist. He may argue that even if the size of the aggregate demand remains the same but a restructuring in the sectoral demands, then the level of the economic activities will change, perhaps, substantially. This is because an input-output analyst visualizes an economy of several producing sectors and each one characterized by a different production technology. Thus, the impact of demand on each sector will not be the same. In this regard, an example given by Yan (1969) could give us a clear idea about the implication of multisectoral input-output model in comparison to the aggregative macro model. This example is given as follows:

"John Smith usually takes his family for a trip to the seashore every summer. This year, however, he decides to buy them a colour television set instead. There is no change in the amount of money John Smith plans to spend; he merely switches his spending from a seashore trip to a colour television set.

We shall now consider the effect of John Smith's decision on the nation's economy.

Of course, John smith is only one man, and his impact on the nation is small. But if we had an `economic microscope' strong enough to detect the impact of Mr. smith's change in vacation plans, we would observe the following changes. Businessmen are sensitive to the fluctuation in their business and must adjust the levels of employment and purchases of raw materials and orders for new capital equipment to the change in sales. Thus, in the passenger transportation, and hotel industry, some people are laid off, some orders for new transportation equipment are cancelled, and the construction of new hotel rooms is slowed down because of the reduction in business. In contrast, the television manufacturing industry hires more people, purchases additional raw materials and perhaps orders some new machines to increase production capacity because of the increase in business. This is the direct effect of John Smith's decision.

A series of indirect effect follows the direct effect. The transportation equipment industry and construction industry will be adversely affected by the contraction in the passenger transportation industry and hotel industry. A readjustment of employment and purchases of various inputs in these industries will take place. In the next round of indirect reaction, industries such as steel, aluminium, machinery, and building materials which supply raw materials and semifinished goods to the transportation industry will suffer reduction in business and thus readjust their purchases of input. The repercussion

will extend to more and more industries in the economy. Favourable changes in the industries which directly and indirectly supply inputs to the television manufacturing industry will also occur, and will partly or entirely offset the first group of changes ..... the effect of changes in the composition of an aggregate variable must often be ignored in macro analysis. For example Gross National Product (GNP) will be unchanged when the aggregate variables making up GNP (consumption, investment, government expenditure, and trade) remain unchanged. In our example, John Smith spent the same total amount when he switched from seashore trip the colour television set. According to microanalysis, his aggregate consumption is unaltered. Consequently, so is his contribution to GNP. Input-output economists argue that Mr. Smith's change of mind does not leave everything unchanged. Consider for example, the effect on employment. The passenger transportation industry and hotel industry may require more labour per dollar of goods sold than the television manufacturing industry. Therefore, the direct effect of John smith's decision may be to reduce employment. The reduction in employment will decrease wage income. If wage earners have consumed more and saved less than nonwage earners, consumption will fall and so will GNP. These changes are not accounted for in macro analysis" [1].

2.1.2 Review of the Regional Input-Output Studies in India

Input-output models have been widely used to analyze a range of problems of national economies (Blitzer, 1975). In

assumption. However this assumption is based on certain real world phenomenons related to the behaviour of business firms. No business firm would be able to change the production technology overnight. They can do so if and only if (a) the cost of the alternate technology and (b) the scientific developments permit technical changes. But then there remains the question of the time phenomenon. Scientific developments even if make possible for new technologies, it takes time for their commercialisation and final application in the real world business. Further, business firms may be reluctant to change the technology in the short run for several reasons both business and non business kinds in nature. Thus, it would be quite reasonable to assume that production technology may remain unchanged in the short to the medium runs.

(iii) the third assumption states that a competitive market environment prevails in the concerned economy.

(iv) the fourth assumption is the famous Hawkins-Simon condition. It states that for any ith sector, if it uses its own output as an intermediate input in its own production, then one minus the amount of such input per unit monetary value of output, denoted by a_{ii} coefficient, should be positive and also the sum of all the intermediate and value added coefficients of that sector should be equal to one. In other words, this assumption states that value of inputs should not exceed the value of output. Alternatively, the total cost of production should not be greater than the total revenue for a sector. The idea behind this assumption conforms to the competitive profit maximization principle.

2.1.4 The Basic Input-Output Tables

Leontief's input-output technique deals with the quantitative analysis of the interdependence among various producing and final consuming units of an economy. An input-output table in this regard forms the basis for such analysis. The structure of an input-output accounting system can be spelt out in the following Table 2.1.

In an input-output table, for each sector its flows of goods and services to other sectors of an economy over a specified period of time, usually a year, is represented in value terms. It gives the systematic description of the sectoral transactions by way of two way table. The rows of the table describe the distribution(or supply) of a sector's output to all other producing sectors known as intermediate deliveries and final users. The columns of the table describe each sector's purchases of intermediate goods and primary inputs. The distinctions between intermediate purchases, final uses and primary inputs enable us to classify the transactions in an input-output table into four different categories:

First, the transactions among the producing sectors comprise the important portion of an input-output table. These transactions are represented in Table 2.1 as X_{ij} which indicates the delivery of the output of sector i to the sector 'j'. Since each sector appears both as a producing unit and a consuming unit, the transactions denoted by X_{ij} will form a square matrix. The sum of all the intermediate deliveries X_{ij}

STRUCTURE OF AN INPUT-OUTPUT ACCOUNTING SYSTEM

TABLE NO. 2.1	PRODUCING SECTOR					FINAL SECTOR							
PRODUCING SECTORS	INTERMEDIATE TRANSACTION					INTERMEDIAIE SALES	PRIVATE CONSUMPTION	GOVT. EXPENSES	INVESTMENT	EXPORT	IMPORT (-)	FINAL DEMAND	GROSS OUTPUT
X1	X11	X12	.	.	X1n	T1	C1	Co1	I1	E1	M1	F1	X1
X2	.				.	.	.	.	.	.	.	.	.
.										.	.	.	.
.	.				.	.	.	.	.	.	.	.	.
.						.	.	.	.	.	.	.	.
Xn	Xn1	Xn2	.	.	Xnn	Tn	Cn	Con	In	En	Mn	Fn	Xn
.													
Xn													
PRIMARY INPUT value added	V1	V2	.	.	Vn	Vo							
GROSS OUTPUT / TOTAL	X1	X2	.	.	Xn	T	C	Co	I	E	M	X	X

by an ith sector to all other sectors as well as its own sector is denoted by T_i.

Secondly, the sum of all final type deliveries such as consumption, investment and net export of an ith sector is denoted by F_i.

The third type of transaction is the payments to the primary inputs denoted by V_j which indicates the values added by a sector j.

The fourth type of transaction shown in Table 2.1 is the payment to primary inputs by the final demand categories represented by V_o. The inclusion of this transaction is necessary to ensure consistency of input-output table with the national (or state) income and product aggregation.

2.1.5 Fundamental Equations

From the input-output accounts certain fundamental equations can be derived in the following way:

(i) the total production of sector i denoted as X_i is defined as the sum of all deliveries of the output of the ith sector to all the producing sectors and final consumers.

In equation form this can be written as :

$$X_i = \sum_j X_{ij} + \sum_k F_{ik} , \qquad (2.1)$$

for i = 1,..n; and k = 1,..K

Since in a competitive market the total value of sectoral production is equal to the total cost of production in each sector, the row sums and column sums for each sector in the input-output table will be equal:

$$\sum_j X_{ij} + \sum_k f_{ik} = \sum_i X_{ij} + V_i \qquad (2.2)$$

Thirdly, the sum of all the intermediate deliveries of all the sectors and final uses must be equal to the sum of all the intermediate deliveries and value added. This can be expressed as given below:

$$\sum_i \sum_j X_{ij} + \sum_i \sum_k f_{ik} = \sum_i \sum_j X_{ij} + \sum_j V_j \qquad (2.3)$$

where $i = 1,\ldots,n$; $j = 1,\ldots,n$ and $k = 1,\ldots,n$

It follows from the above equation (2.3) that the sum of all final uses is equal to the sum of all value added:

$$\sum_j V_j = \sum_i \sum_k f_{ik} \qquad (2.4)$$

These are the basic equations which form the background for an input-output model. There will be some more equations in this study and they would be used in the relevant chapters.

2.1.6 The Input-Output Model

From the transactions or inter-industry matrix as described in Table 2.1, one can derive a technical input-output coefficient matrix. A technical input-output coefficient denoted by 'a_{ij}' states the amount of input from the ith sector required by the jth sector for its production of one unit of output. These a_{ij} coefficients are derived in the following way:

$$a_{ij} = X_{ij} / X_j \quad \text{or} \quad X_{ij} = a_{ij}.X_j \qquad (2.5)$$

The technical coefficients can be arranged in a square matrix in the same way as it is done for the input-output transaction matrix in the input-output table. This coefficient matrix denoted by A is presented below:

electricity, and gas works & distribution. In the tertiary category, there are six sectors. These are railway, transport other than railways, storage, communications (post and telecommunications etc.) trade (wholesale trade and commerce, hotels and tourism), and the banking & insurance sectors. The list of sectors and its description is provided in Table 3.1.

The basic input-output accounting tables, consists of input-output transactions table, transaction coefficients table, capital coefficients table, and static, and dynamic type Leontief inverse matrices . These tables are named as Table 3.2, 3.3, 3.4, 3.5 and 3.6, respectively.

In Table 3.2, there are three blocks : the first block represents intermediate flows table of order 31x31, the second block represents the final demand components of consumption, government expenditure, investment, exports and imports, each of the order 31 x 1, known as column vectors and third block represents the value added in which we have one row each for gross value added, depreciations, net value added and labour employed. Further in this table, rows represent the producing sectors and columns as the consuming sectors.

In the flow matrix, the row sums give the total demand for the output of a sector by all other sectors (intermediate supplies) and column sums give the total value of intermediate inputs coming from different industries for production purposes. In the final demand block, the first column indicates the consumption by households, second column for government sectors, third column for the investment, and the

fourth column for the exports of various outputs coming from various producing sectors. The fifth column shows the competitive imports of goods and services into the domestic economy because supply lags behind total demands for outputs of the sectors. The last column of the Table 3.2 gives the total money value of output produced by various sectors known as gross output.

3.2 Summary of Input-Output Accounts of the Orissa State (Year 1983-84)

3.2.1 Structure of Production

Table 3.7 summarizes the sectoral structure of input-output statistics, in terms of percentage figures, for the sectoral gross output, intermediate purchases, intermediate sales, private consumption, investment, exports, imports, workers employed and the net labour productivity for the Orissa economy in the year 1983-84.

From this table it can be seen that primary sector accounted for 48 percent of the gross output of the Orissa economy in the year 1983-84. Secondary sector that included mining and manufacturing contributed 34 percent while services sector contributed 18 percent of gross output of the Orissa economy in the year 1983-84.

Further, in the secondary sector, Iron and Steel was the largest producer after accounting for 11 percent of the state's gross output followed by construction (9 percent), mining (2.21 percent), food (1.71 percent) electricity (1.70 percent), non-metallic minerals (1.65 percent), paper (1.38 percent), cement (0.84 percent), fertilizer (0.46 percent), basic metals

(0.45 percent), chemicals (0.41 percent), gas (0.24 percent), wood (0.23 percent) and tobacco (0.225 percent).

Within the manufacturing sector, agro-based manufacturing sectors accounted for a mere 5 percent and non-agro-based manufacturing 24 percent of the gross output of Orissa state in the year 1983-84.

In the tertiary sectors, trade was the largest sector by contributing 8.59 percent of total gross value of output of Orissa economy, followed by transport (5.62 percent), railway (1.95 percent), banking (1.48 percent) and communication (0.32 percent). Storage sector was very insignificant in the Orissa economy in terms of value of its gross output.

3.2.2 Structure of Net Value Added

The sectoral structure of net value added was such that the Primary sector accounted for the largest amount of 65.82 percent of total income (Net value added) of the Orissa economy in 1983-84. Secondary and Tertiary sectors accounted for 18.63 percent and 15.55 percent respectively.

In the secondary sector, construction was the largest contributor to the state's income, after having a share of 6.45 percent, followed by Iron and steel sector (3.94 percent), mining (3.04 percent), electricity (1.50 percent), non-metallic minerals (0.58 percent), and food (0.53 percent). All other sectors contributed less than 0.50 percent of state's income.

In the manufacturing sectors, the agro-based sectors collectively accounted for a mere 1.75 percent of state's income and non-agro-based manufacturing sectors accounted for 5.68 percent of state's income, excluding construction sector.

In case of the services sector, the largest contributor to state's income was again trade sector (8.18 percent), followed by transport (3.88 percent), banking (1.90 percent) and railway (1.17 percent). The storage and communication sectors had much little contributions to the state's income in the year 1983-84.

3.2.3 Structure of Private Consumption

The total value of final consumption by the private households was 37822 million rupees. This accounted for 82 percent of the state's total income (net value added) in the year 1983-84.

Broad sector-wise, primary sector accounted for the largest amount of 77.84 percent while the secondary and services sectors had shared, respectively, 17.47 percent and 4.69 percent of the total consumption expenditure of the state.

Within the secondary sector, agro-based manufacturing sector accounted for 14.03 percent and non agro-based manufacturing only 3.44 percent of the total consumption expenditure of the state. In case of agrobased sectors, main items of household expenses were cotton textiles 3.93 percent of total income of the state, followed by processed food products 2.93 percent, wood and wood products 2.68 percent, misc.textiles 1.31 percent and beverages 1.02 percent.

In case of non-agrobased sectors, main items of household expenses were chemical products 2.57 percent, followed by coaltar & petroleum products 0.79 percent, non-metallic minerals 0.34 percent and electricity 0.32 percent of total income of the state.

In case of the services sector, the largest amount of expenditure was incurred on the trade Sector i.e 2.89 percent followed by transport services 1.13 percent, communication 0.29 percent, railway 0.20 percent and banking 0.18 percent.

3.2.5 Structure of Investment

In the investment component of final demand, the secondary sector shared 78 percent, services sector 12.5 percent and primary sector .9.5 percent of the Orissa state's gross investment.

In the secondary sector, major sources sector of investment were the construction sector accounting for 52 percent of total investment, followed by iron and steel sector 10.33 percent, electricity 7.57 percent, non-ferrous type basic metal 2.67 percent, non-metallic mineral 1.11 percent and cement 0.99 percent of the state's gross investment.

In the tertiary sector largest investment came from the transport sector 7.62 percent followed by railway sector 2.92 percent and banking 1.15 percent.

3.2.5 Structure of Export and Import

The total value of export was nearly 13 percent of the state's gross output in the year 1983-84. The structure of exports indicated that a mere 7 percent of total export could be attributed to the primary sector but 63 percent to the secondary sector and 31 percent to the services sector.

In the manufacturing sector the largest contribution of 42 percent of total export was made by the Iron and steel sector followed by the paper sector with 9 percent, cement 4 percent and non-metallic mineral with 3 percent.

On the other hand, the structure of imports indicated that the manufactured items accounted for a large share of 93 percent of the state's total imports while the primary and services sector shared, respectively, 6 percent and 1 percent. Within manufacturing sector, items of agro-based manufacturing sectors shared 9 percent of total value of export but 31 percent of total value of import in the Orissa state. It may be noted that there is a substantial gap between export, and import of these products. In a similar manner of expression, non-agro based manufacturing products including minerals, shared 54 percent of total export 62 percent of total import in the Orissa state. Important imported items included petroleum & coaltar products with 15 percent, chemicals 10.60 percent, machinery 10.50 percent, cotton textile 8.80 percent, electricity 8.00 percent, fertilizer 5.00 percent, misc. textiles 4.00 percent, metal products 4.00 percent and non-metallic minerals 4.00 percent of the total import of the state.

3.2.6 Structure of Input-Output Coefficients

The overall input-output coefficient for the economy of Orissa as a whole was estimated at 0.3536. There were six sectors whose overall input-output coefficients were lower than the average input-output coefficient for the Orissa economy as a whole. These were agriculture (0.1299), mining (0.1549), electricity (0.3371), gas (0.1062), storage (0.1281) and banking (0.1555) (see Table 3.3).

Broadly it was observed that average input-output coefficients were lower for primary, mining, construction, electricity, gas works and services sectors in comparison to the manufacturing sectors.

Further within the manufacturing sector, agro-based manufacturing sectors had lower input-output coefficients in comparison to the non agro-based manufacturing sectors.

In the manufacturing sector, food, wood, leather, coaltar, cement, non-metallic minerals, iron and steel, basic metals, metal products and machinery had the input-output coefficients on an average of 0.70.

3.2.7 Structure of Labour

Broadly, primary agriculture and its allied sectors absorbed 79.79 percent of the total workforce of the Orissa economy in the year 1983-84. The shares of secondary mining and manufacturing, and tertiary sector in total workers of the state were 13.71 percent and 6.50 percent respectively.

In the secondary sector, the construction sector absorbed the bulk of labour force by 11.49 percent of total workers of the Orissa State. Mining sector absorbed 0.86 percent of the total work force of the state. Thus, pure manufacturing accounted for a mere 2.22 percent of total workers of the state.

Further in the manufacturing sector, iron and steel (0.36 percent), electricity (0.36 percent), paper (0.19 percent) and non-metallic minerals (0.11 percent) together accounted for one percent of the total workers. The remaining manufacturing

sectors therefore shared 1.22 percent of total workers of the state.

In case of the services sector, highest share went to the trade sector for absorbing 4.25 percent of total workforce of the state. Transport sector was the second service sector absorbing 1.21 percent of total workers of the state. Railway, banking, and communications sector had shares of 0.73 percent, 0.17 percent and 0.13 percent, respectively, of the total workers of the state.

Thus the occupational structure of labour force of the Orissa economy reflected its severe under developed conditions. Because in developed economies primary sector only accounts for a mere 2 to 3 percent of total work force while manufacturing and services absorb bulk of employment.

3.2.8 Labour Productivity

Though agriculture, mining, construction and service sectors absorbed higher amounts of labour force of the Orissa state, productivity in terms of income in these sectors was very low. Labour productivity in terms of income (i.e net value added) of thousand rupees per persons employed in agriculture, mines, construction, trade and transport sectors, were 3.76, 16.16, 2.56, 8.76 and 14.55 respectively in the year 1983-84.

In case of manufacturing, gas works, basic metals, tobacco, cement, rubber, fertilizer, iron and steel, miscellaneous textiles, and food processing sectors had high

17.	Non-metallic Minerals	Non-metallic minerals
18.	Iron & Steel	Iron & Steel
19.	Other Basic metal alloys	Basic metal
20.	Metal Products	Metal
21.	Machinery	Machinery
22.	Misc. Manufacturing	Misc. manu-facturing
23.	Construction	Construction
24.	Electricity	Electricity
25.	Gas Supply & Gas Works	Gas
26.	Railway	Railway
27.	Road Transport	Transport
28.	Storage, Water Supply & ware housing	Storage
29.	Communication	Communication
30.	Trading Activities	Trade
31.	Banks & Insurances	Banking

Table 3.2 Inter-Industry Transactions for Orissa, 1983-84
(in Rs,000)

producing sectors (inter-industry transations)

producing sectors	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	2170741	23	550984	0	52095	104442	7159	1411	73330	125000	4298	0	0	209
2	57	6297	673	294	125	1996	208	402	0	103946	4	0	159	10224
3	32017	0	62006	4543	2305	176	0	0	0	0	0	0	0	878
4	12	0	167	3996	0	3	0	0	0	0	0	0	0	0
5	0	0	0	0	417	0	0	0	0	0	0	0	0	0
6	1685	2	0	0	0	111467	0	5049	221	148	262	412	0	0
7	997	52	16528	0	448	1425	3052	114	0	798	0	140	0	11921
8	28232	8	647	0	188	160	1351	1075	85	5509	17	595	0	0
9	3504	3019	584	243	410	1480	158	102	36115	25125	16	163	0	374
10	2185	2784	2577	3	1962	1633	894	7	0	66172	10	216	0	204
11	0	0	0	0	0	459	293	0	0	99	2325	0	0	0
12	1764	952	531	0	0	60	0	114	1318	86	531	7304	0	1363
13	249366	24504	4870	970	976	2696	461	93	3252	13976	22	224	9	28900
14	974908	0	0	0	0	282	0	0	0	0	0	0	0	25220
15	1954	30421	3233	2027	0	15203	2674	550	313	140355	594	9681	0	34318
16	0	0	0	0	0	0	54	0	397	0	0	0	0	0
17	685	0	0	0	0	136	0	0	0	227	0	108	0	2100
18	1266	122	0	0	0	1465	0	0	214	0	0	269	0	778
19	107	0	0	0	0	0	0	0	1296	1001	0	107	0	21
20	7214	6038	0	0	0	2468	30	0	272	387	82	0	0	2326
21	66685	57705	9023	142	3093	6868	2355	0	0	109333	9	61	10	10206
22	540	564	0	0	0	3106	0	30	0	0	0	0	0	171
23	147000	2599	54	3029	0	2874	564	93	485	11283	16	378	0	7224
24	116634	52644	2126	183	474	13396	2757	101	3017	78395	37	767	59	25828
25	474	18	16654	422	140	784	0	0	5	84	0	0	0	1424
26	54716	5824	44	9	7	1469	0	0	0	9254	0	0	0	5452
27	115445	20181	0	180	861	13417	1600	152	1276	7007	114	400	0	5700
28	440	0	49800	434	2753	0	0	0	0	0	0	0	0	400
29	7145	328	0	0	0	803	0	62	0	4565	0	0	0	0
30	557284	27271	16468	0	417	55250	2426	1339	13018	82461	0	9318	0	42600
31	94526	16769	275146	0	8864	8766	0	350	0	8210	0	0	0	6475
gross input	4637583	258125	1012193	16474	75534	352283	26036	11042	134614	793422	8336	30143	237	224405
gross output	35709040	1665900	1271048	24776	167268	544934	68797	28969	170176	1026256	11393	54111	304	340806
gross value added	31071457	1407775	258855	8302	91734	192651	42761	17927	35562	232834	3057	23968	67	116401
depreciation	659810	972	11769	297	277	25303	5124	185	2000	36937	30	606	39	30997
net value added	30411647	1406803	247086	8005	91457	167348	37637	17742	33562	195897	3027	23362	28	85404
labour employed	8090584	87079	6900	351	929	6568	2124	443	3070	19169	128	327	121	1463

Continued

(inter-industry transations)

producing sectors	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	5479	42	642	8376	0	55	63	27	129762	36	0	231	40212	0	0
2	4871	91730	343485	568986	51558	274	284	25	10654	63484	797	29336	195	0	0
3	4371	0	577	126	0	0	13	0	0	0	0	0	31734	1	0
4	217	0	0	0	0	0	0	0	0	0	0	0	987	0	0
5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1185	0	3106	1127	0	18	59	3	190	0	0	1556	33	0	0
7	1635	80625	10045	6681	0	226	598	28	39077	0	15	0	0	11	0
8	37	0	864	10536	30	89	98	2	0	4465	0	242	6180	3	85
9	2066	315	13765	12138	96	804	2866	70	303931	309	81	1907	115	4	39
10	3301	476	12905	5352	0	380	1174	48	3018	867	942	3385	14577	1	5804
11	0	0	0	1365	0	0	1	5	0	0	0	0	1357	51	0
12	1582	112	3221	2571	0	172	1920	33	349	0	111	1091	30821	7	56
13	12159	9360	45074	376162	74519	1262	4962	43	116607	6895	866	81568	593330	21	764
14	934	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	87183	732	47154	66381	22958	1429	17681	466	159360	2118	4778	293	2955	53	4
16	221	35620	27957	649	0	0	0	0	24980	0	0	0	0	0	0
17	1694	5310	150514	3652	0	240	834	77	999175	0	0	5139	861	0	1
18	1393	15124	41483	2281548	0	36166	46148	576	675892	1758	235	17287	551	0	0
19	4369	0	1218	30086	4093	11250	98356	10	0	0	0	0	58538	0	0
20	7654	9425	16844	433314	77	4138	89076	239	756	0	2377	30326	0	10	9
21	5767	19609	12953	411419	0	940	72765	122	235792	22553	2066	275018	397695	118	5703
22	175	0	336	128843	0	20	10	114	18333	103	217	17	25579	21	66
23	4385	5613	15505	130813	0	730	3123	13	880	24688	525	106583	5498	121	7491
24	10717	55686	12482	354773	80213	1487	6595	65	102064	212631	3879	52717	2335	394	2403
25	901	185	1092	10334	38	0	122	0	4948	5295	305	351	0	3	277
26	2449	24171	15690	316103	0	0	3741	37	97123	24462	305	18199	29321	0	2639
27	3600	9810	40672	126694	0	72	3852	38	148302	5284	610	15431	538984	135	3381
28	0	0	0	0	0	0	0	0	0	172	0	0	0	0	0
29	1081	994	2763	15130	0	470	1653	0	2329	2963	291	1775	21347	0	0
30	30636	108805	67651	999938	0	8045	18666	331	796592	45963	219	37192	389624	58	1895
31	4598	6836	20197	115903	0	0	4252	40	19927	2072	8	50625	33421	0	2
gross input	204749	479780	908193	6426999	233582	68267	378905	2413	3890041	426118	18627	730269	2226242	1012	30619
gross output	308162	621559	1223452	8429415	331429	115254	451531	5382	6974274	1264103	175454	1451633	4177649	2863	238954
gross value added	103413	141779	315259	2002416	97847	46987	72626	2969	3084233	837985	156827	721364	1951407	1851	208335
depreciation	19072	18758	47561	183391	2991	5616	16953	724	105700	146714	23160	178700	159300	640	17600
net value added	84341	123021	267698	1819025	94856	41371	55673	2245	2978533	691271	133667	542664	1792107	1211	190735
labour employed	2839	1453	11302	38275	599	2133	3870	143	1164792	36477	38	73706	123281	52	12720

Continued

final demand block

producing sectors	30	31	gross sales	private consumption	government expenditure	investment	export	import	gross output
1	1037775	0	4342392	29441174	944200	1187600	645270	851596	35709040
2	26961	0	1317027	6417	21700	84500	345599	109343	1665900
3	249834	0	388660	1106519	0	71817	1643	297592	1271048
4	4825	0	10207	384367	0	786	0	378583	24776
5	317	0	741	317057	0	1739	0	152273	167265
6	9182	0	135705	1485086	0	58551	41042	1175449	544934
7	13195	0	187601	0	0	3453	0	122257	68797
8	7858	9	68365	496182	0	116	0	535694	28969
9	16159	2318	428275	1011763	5615	9974	0	1285451	170176
10	27629	1156	159661	4314	1684	30394	830203	0	1026256
11	0	32152	38108	19924	0	103	0	46742	11393
12	8137	0	64206	96855	898	7363	2956	118167	54111
13	6499	199	1660605	299575	0	525	0	1960402	304
14	0	1337	1002680	75	117	21102	0	683051	340886
15	3456	0	658324	972969	49295	43172	8081	1423679	308162
16	0	0	89879	0	0	123934	407746	0	621559
17	19886	0	1190640	130128	0	138658	315005	550979	1223452
18	1504	0	3123779	0	0	1286700	4018936	0	8429415
19	0	0	210444	82	0	332639	64059	275796	331429
20	7031	0	620092	9827	11935	25760	1474	553834	115254
21	11410	6506	1745926	15509	18161	69284	4453	1401802	451531
22	5824	5601	189671	110433	471	958	0	296151	5382
23	31233	7148	519948	0	0	6454326	0	0	6974274
24	77143	4027	1276028	120307	3721	942680	0	1078633	1264103
25	13991	6901	72749	19920	74400	11352	0	2967	175454
26	37209	298	648522	74214	0	363600	365297	0	1451633
27	397555	3174	1463287	426183	178000	949600	1160579	0	4177649
28	0	10822	64829	0	0	341	0	62307	2863
29	24443	13622	101764	110030	0	78600	0	51441	238954
30	299726	19696	3632887	1094649	213000	60000	1380856	0	6382192
31	170634	56129	903751	67987	0	99800	28662	0	1100200
gross input	2509416	171095	26316756	37821547	1523997	12459427	9621861	13406189	74337284
gross output	6382192	1100200							
gross value added	3872776	929105							
depreciation	93300	52200							
net value added	3779476	876905							
labour employed (persons)	431288	17345							

Table 3.3 Input-Output Coefficients Matrix for Orissa, year 1983-84

sector no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.0688	0.0000	0.4335	0.0000	0.3114	0.1917	0.1041	0.0487	0.4389	0.0769	0.3772	0.0000	0.0000	0.0006	0.0178
2	0.0000	0.0038	0.0005	0.0115	0.0007	0.0037	0.0030	0.0139	0.0000	0.0639	0.0003	0.0000	0.5230	0.0300	0.0158
3	0.0009	0.0000	0.0488	0.1781	0.0138	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0026	0.0142
4	0.0000	0.0000	0.0001	0.1566	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007
5	0.0000	0.0000	0.0000	0.0000	0.0025	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.2046	0.0000	0.1743	0.0013	0.0001	0.0230	0.0076	0.0000	0.0000	0.0038
7	0.0000	0.0000	0.0130	0.0000	0.0027	0.0026	0.0444	0.0039	0.0000	0.0005	0.0000	0.0026	0.0000	0.0350	0.0053
8	0.0008	0.0000	0.0005	0.0000	0.0011	0.0003	0.0196	0.0371	0.0005	0.0034	0.0015	0.0110	0.0000	0.0000	0.0001
9	0.0001	0.0018	0.0005	0.0095	0.0025	0.0027	0.0023	0.0035	0.2122	0.0154	0.0014	0.0030	0.0000	0.0011	0.0067
10	0.0001	0.0017	0.0020	0.0001	0.0117	0.0030	0.0130	0.0002	0.0000	0.0407	0.0009	0.0040	0.0000	0.0006	0.0107
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0043	0.0000	0.0000	0.0001	0.2041	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0006	0.0004	0.0000	0.0000	0.0001	0.0000	0.0039	0.0077	0.0001	0.0466	0.1350	0.0000	0.0040	0.0051
13	0.0070	0.0147	0.0038	0.0380	0.0058	0.0049	0.0067	0.0032	0.0191	0.0086	0.0020	0.0041	0.0296	0.0848	0.0395
14	0.0273	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0740	0.0030
15	0.0001	0.0183	0.0025	0.0794	0.0000	0.0279	0.0389	0.0198	0.0018	0.0863	0.0521	0.1789	0.0000	0.1007	0.2829
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007
17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0001	0.0000	0.0020	0.0000	0.0062	0.0055
18	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0027	0.0000	0.0000	0.0013	0.0000	0.0000	0.0050	0.0000	0.0023	0.0045
19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0076	0.0006	0.0000	0.0020	0.0000	0.0001	0.0142
20	0.0002	0.0036	0.0000	0.0000	0.0000	0.0045	0.0004	0.0000	0.0016	0.0002	0.0072	0.0000	0.0000	0.0068	0.0248
21	0.0019	0.0346	0.0071	0.0056	0.0185	0.0126	0.0342	0.0000	0.0000	0.0672	0.0008	0.0011	0.0329	0.0299	0.0187
22	0.0000	0.0003	0.0000	0.0000	0.0000	0.0057	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0006
23	0.0041	0.0016	0.0000	0.1187	0.0000	0.0053	0.0082	0.0032	0.0029	0.0069	0.0014	0.0070	0.0000	0.0212	0.0142
24	0.0033	0.0316	0.0017	0.0072	0.0028	0.0246	0.0481	0.0035	0.0177	0.0482	0.0032	0.0142	0.1941	0.0758	0.0348
25	0.0000	0.0000	0.0131	0.0165	0.0008	0.0014	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0042	0.0029
26	0.0015	0.0035	0.0000	0.0004	0.0000	0.0027	0.0000	0.0000	0.0000	0.0057	0.0000	0.0000	0.0000	0.0160	0.0079
27	0.0032	0.0121	0.0000	0.0071	0.0051	0.0246	0.0233	0.0052	0.0075	0.0043	0.0100	0.0074	0.0000	0.0170	0.0119
28	0.0000	0.0000	0.0392	0.0170	0.0165	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0000
29	0.0002	0.0002	0.0000	0.0000	0.0000	0.0015	0.0000	0.0021	0.0000	0.0028	0.0000	0.0000	0.0000	0.0000	0.0035
30	0.0156	0.0164	0.0130	0.0000	0.0025	0.1014	0.0353	0.0462	0.0765	0.0507	0.0000	0.1722	0.0000	0.1250	0.0994
31	0.0026	0.0101	0.2165	0.0000	0.0530	0.0161	0.0000	0.0121	0.0000	0.0050	0.0000	0.0000	0.0000	0.0190	0.0149
column sum of coefficients	0.1299	0.1549	0.7963	0.6457	0.4516	0.6465	0.3784	0.3812	0.7910	0.4879	0.7317	0.5571	0.7796	0.6585	0.6644

sector no	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	0.0005	0.0010	0.0000	0.0005	0.0001	0.0050	0.0186	0.0000	0.0000	0.0002	0.0096	0.0000	0.0000	0.1626	0.0000
2	0.2808	0.0675	0.1556	0.0024	0.0006	0.0047	0.0015	0.0502	0.0045	0.0202	0.0000	0.0000	0.0000	0.0042	0.0000
3	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0076	0.0003	0.0000	0.0391	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0008	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0025	0.0001	0.0000	0.0002	0.0001	0.0006	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000	0.0014	0.0000
7	0.0082	0.0008	0.0000	0.0020	0.0013	0.0053	0.0056	0.0000	0.0001	0.0000	0.0000	0.0038	0.0000	0.0021	0.0000
8	0.0007	0.0012	0.0001	0.0008	0.0002	0.0003	0.0000	0.0035	0.0000	0.0002	0.0015	0.0010	0.0004	0.0012	0.0000
9	0.0113	0.0014	0.0003	0.0070	0.0063	0.0130	0.0436	0.0002	0.0005	0.0013	0.0000	0.0014	0.0002	0.0025	0.0021
10	0.0105	0.0006	0.0000	0.0033	0.0026	0.0090	0.0004	0.0007	0.0054	0.0023	0.0035	0.0003	0.0243	0.0043	0.0011
11	0.0000	0.0002	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	0.0003	0.0178	0.0000	0.0000	0.0292
12	0.0026	0.0003	0.0000	0.0015	0.0043	0.0062	0.0001	0.0000	0.0006	0.0008	0.0074	0.0024	0.0002	0.0013	0.0000
13	0.0368	0.0446	0.2248	0.0109	0.0110	0.0081	0.0167	0.0055	0.0049	0.0562	0.1420	0.0073	0.0032	0.0010	0.0002
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012
15	0.0385	0.0079	0.0693	0.0124	0.0392	0.0866	0.0228	0.0017	0.0272	0.0002	0.0007	0.0185	0.0000	0.0005	0.0000
16	0.0229	0.0001	0.0000	0.0000	0.0000	0.0000	0.0036	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.1230	0.0004	0.0000	0.0021	0.0018	0.0143	0.1433	0.0000	0.0000	0.0035	0.0002	0.0000	0.0000	0.0031	0.0000
18	0.0339	0.2707	0.0000	0.3138	0.1022	0.1070	0.0969	0.0014	0.0013	0.0119	0.0001	0.0000	0.0000	0.0002	0.0000
19	0.0010	0.0036	0.0123	0.0976	0.2178	0.0019	0.0000	0.0000	0.0000	0.0000	0.0140	0.0000	0.0000	0.0000	0.0000
20	0.0138	0.0514	0.0002	0.0359	0.1973	0.0444	0.0001	0.0000	0.0135	0.0209	0.0000	0.0035	0.0000	0.0011	0.0000
21	0.0106	0.0488	0.0000	0.0002	0.1612	0.0226	0.0338	0.0178	0.0118	0.1895	0.0952	0.0412	0.0239	0.0018	0.0059
22	0.0003	0.0153	0.0000	0.0002	0.0000	0.0211	0.0026	0.0001	0.0012	0.0000	0.0061	0.0073	0.0003	0.0009	0.0051
23	0.0127	0.0155	0.0000	0.0063	0.0069	0.0025	0.0001	0.0195	0.0030	0.0734	0.0013	0.0423	0.0313	0.0049	0.0065
24	0.0102	0.0421	0.2420	0.0129	0.0146	0.0121	0.0146	0.1682	0.0221	0.0363	0.0006	0.1376	0.0101	0.0121	0.0037
25	0.0009	0.0022	0.0001	0.0000	0.0003	0.0000	0.0007	0.0042	0.0017	0.0002	0.0000	0.0010	0.0012	0.0022	0.0063
26	0.0128	0.0375	0.0000	0.0000	0.0083	0.0068	0.0139	0.0194	0.0017	0.0125	0.0070	0.0000	0.0110	0.0058	0.0003
27	0.0332	0.0150	0.0000	0.0006	0.0085	0.0071	0.0213	0.0042	0.0035	0.0106	0.1290	0.0472	0.0141	0.0623	0.0029
28	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0098
29	0.0023	0.0018	0.0000	0.0041	0.0037	0.0000	0.0003	0.0023	0.0017	0.0012	0.0051	0.0000	0.0000	0.0038	0.0124
30	0.0553	0.1186	0.0000	0.0698	0.0413	0.0614	0.1142	0.0364	0.0012	0.0256	0.0933	0.0203	0.0079	0.0470	0.0179
31	0.0165	0.0137	0.0000	0.0000	0.0094	0.0074	0.0029	0.0016	0.0000	0.0349	0.0080	0.0000	0.0000	0.0267	0.0510
column sum of coefficients	0.7423	0.7624	0.7048	0.5923	0.8392	0.4483	0.5578	0.3371	0.1062	0.5031	0.5329	0.3535	0.1281	0.3932	0.1555

Table 3.4 Capital Coeficients for the Orissa Economy, Year 1983-84

Sector no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.5752	0.0000	0.0534	0.0000	0.0563	0.0704	0.0772	0.0142	0.1296	0.0190	0.0344	0.0000	0.0000	0.0011	0.0059
2	0.0000	0.0153	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0158	0.0000	0.0000	0.0486	0.0527	0.0000
3	0.0002	0.0000	0.1018	0.1009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0045	0.0000
4	0.0000	0.0000	0.0000	0.1122	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
5	0.0000	0.0000	0.0000	0.0000	0.0215	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.1113	0.0000	0.0509	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1433	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0614	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0146	0.0499	0.0000	0.0008	0.0000	0.0052	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.2366	0.0038	0.0001	0.0014	0.0000	0.0019	0.0022
10	0.0000	0.0000	0.0002	0.0001	0.0021	0.0000	0.0000	0.0001	0.0000	0.0201	0.0000	0.0019	0.0000	0.0011	0.0035
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0598	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0011	0.0023	0.0000	0.0042	0.1729	0.0000	0.0000	0.0017
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0883	0.0000	0.0000
14	0.0074	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1668	0.0000
15	0.0000	0.0740	0.0003	0.0450	0.0000	0.0102	0.0000	0.0055	0.0000	0.0006	0.0213	0.0047	0.0850	0.0000	0.1764
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018
18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	0.0001	0.0147	0.0000	0.0000	0.0000	0.0017	0.0003	0.0000	0.0005	0.0001	0.0007	0.0000	0.0000	0.0120	0.0082
21	0.2933	1.0747	0.0591	0.3611	0.0095	0.2521	0.6332	0.2423	0.0604	0.1315	0.0194	0.1398	0.7991	0.8707	0.5311
22	0.0000	0.0014	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0002
23	0.0209	0.7708	0.0294	0.1705	0.0046	0.0669	0.2250	0.1197	0.0317	0.0356	0.0157	0.0568	0.7566	0.1335	0.1784
24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0180	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010
26	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
27	0.0009	0.0491	0.0000	0.0040	0.0009	0.0090	0.0173	0.0015	0.0023	0.0011	0.0000	0.0035	0.0000	0.0298	0.0040
28	0.0000	0.0000	0.0048	0.0096	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0021	0.0000
29	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
31	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
average coefficient	0.8979	2.0000	0.2491	0.8034	0.0949	0.5227	1.1115	0.4053	0.4644	0.2492	0.1389	0.4666	1.7105	1.5152	0.9147

Sector no.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0031	0.0001	0.0000	0.0000	0.0003	0.0000	0.0000	0.0411	0.0000
2	0.1630	0.0305	0.0420	0.0053	0.0000	0.0000	0.0003	0.0978	0.0000	0.0035	0.0000	0.0000	0.0000	0.0011	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0099	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000
8	0.0000	0.0000	0.0000	0.0017	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.0000
9	0.0865	0.0007	0.0000	0.0155	0.0002	0.0000	0.0074	0.0000	0.0000	0.0002	0.0000	0.0005	0.0001	0.0000	0.0000
10	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0218	0.0000	0.0005
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0061	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0033	0.0000	0.0018	0.0000	0.0000	0.0001	0.0001	0.0003	0.0008	0.0000	0.0000	0.0000
13	0.0000	0.0201	0.0607	0.0000	0.0003	0.0000	0.0000	0.0000	0.0006	0.0098	0.0050	0.0025	0.0000	0.0003	0.0000
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	0.0224	0.0000	0.0000	0.0000	0.0000	0.0000	0.0039	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0041	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0860	0.0002	0.0000	0.0000	0.0000	0.0306	0.0242	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000
18	0.0000	0.3256	0.0000	0.0000	0.0033	0.0005	0.0164	0.0027	0.0002	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000
19	0.0000	0.0016	0.0256	0.0000	0.0069	0.0127	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	0.0080	0.0232	0.0001	0.1371	0.0063	0.0065	0.0000	0.0000	0.0017	0.0036	0.0000	0.0012	0.0000	0.0003	0.0000
21	0.1858	1.2100	0.0551	0.2581	3.2400	1.1772	0.0715	3.2192	0.0521	2.6464	1.6640	0.8378	0.2086	0.0603	1.0035
22	0.0002	0.0000	0.0000	0.0004	0.0000	0.1079	0.0004	0.0000	0.0000	0.0000	0.0002	0.0025	0.0002	0.0002	0.0025
23	0.0683	0.3453	0.0253	0.1045	0.2508	0.6035	0.0713	0.3579	0.0112	1.9052	0.2100	1.3481	1.4277	0.2737	0.7954
24	0.0000	0.0000	0.0654	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0004	0.0000	0.0006	0.0000
26	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0000	0.0000	0.0000	0.0000
27	0.0193	0.0068	0.0000	0.0014	0.0003	0.0020	0.0036	0.0081	0.0004	0.0000	0.0045	0.0162	0.0123	0.0157	0.0014
28	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0465	0.0000	0.0000	0.0000
29	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0536	0.0000	0.0000	0.0000	0.0000	0.0193	0.0000	0.0000	0.0045	0.0000	0.0000	0.0000	0.0119	0.0000
31	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0252
average coefficient	0.5594	2.0200	0.2723	0.5274	3.5100	1.9718	0.2230	3.6859	0.0666	4.5788	1.8843	2.2627	1.6704	0.4170	1.8286

Table 3.6 Dynamic Inverse Coefficient Matrix for Orissa, year 1983-84

SECTORS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.2186	0.0192	0.5707	0.1065	0.3962	0.2954	0.1649	0.0932	0.5826	0.1201	0.4821	0.0510	0.0239	0.0485	0.0669	0.0662
2	0.0024	1.0193	0.0055	0.0213	0.0035	0.0098	0.0114	0.0166	0.0048	0.0721	0.0024	0.0067	0.5206	0.0536	0.0280	0.1795
3	0.0021	0.0024	1.0620	0.1745	0.0129	0.0058	0.0028	0.0027	0.0043	0.0031	0.0013	0.0081	0.0028	0.0100	0.0181	0.0090
4	0.0000	0.0000	0.0000	1.0114	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
5	0.0000	0.0000	0.0000	0.0000	1.0036	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0001	0.0001	0.0001	0.0000	1.0733	0.0001	0.0597	0.0005	0.0001	0.0078	0.0028	0.0001	0.0002	0.0014	0.0002
7	0.0003	0.0007	0.0055	0.0015	0.0012	0.0014	1.0277	0.0018	0.0004	0.0005	0.0002	0.0015	0.0009	0.0189	0.0027	0.0569
8	0.0001	0.0000	0.0001	0.0000	0.0001	0.0001	0.0012	1.0025	0.0001	0.0002	0.0001	0.0007	0.0000	0.0001	0.0000	0.0001
9	0.0001	0.0014	0.0005	0.0023	0.0005	0.0007	0.0008	0.0008	1.0317	0.0024	0.0003	0.0008	0.0018	0.0010	0.0016	0.0009
10	0.0004	0.0030	0.0034	0.0017	0.0132	0.0047	0.0149	0.0012	0.0008	1.0481	0.0015	0.0066	0.0025	0.0033	0.0142	0.0041
11	0.0000	0.0001	0.0015	0.0003	0.0004	0.0003	0.0009	0.0001	0.0000	0.0001	1.0443	0.0001	0.0001	0.0002	0.0002	0.0002
12	0.0001	0.0005	0.0003	0.0002	0.0001	0.0003	0.0003	0.0015	0.0028	0.0002	0.0159	1.0545	0.0004	0.0017	0.0021	0.0005
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
14	0.0121	0.0002	0.0058	0.0011	0.0040	0.0031	0.0017	0.0010	0.0058	0.0012	0.0048	0.0006	0.0002	1.0379	0.0018	0.0007
15	0.0007	0.0081	0.0016	0.0182	0.0007	0.0068	0.0087	0.0047	0.0011	0.0187	0.0112	0.0388	0.0059	0.0282	1.0605	0.0032
16	0.0001	0.0012	0.0004	0.0012	0.0001	0.0003	0.0015	0.0003	0.0028	0.0003	0.0001	0.0004	0.0018	0.0008	0.0015	1.0728
17	0.0019	0.0190	0.0067	0.0186	0.0021	0.0053	0.0077	0.0047	0.0031	0.0052	0.0016	0.0065	0.0283	0.0152	0.0136	0.0183
18	0.0068	0.0438	0.0159	0.0351	0.0063	0.0182	0.0217	0.0110	0.0101	0.0154	0.0054	0.0184	0.0649	0.0356	0.0330	0.0706
19	0.0026	0.0093	0.0037	0.0042	0.0021	0.0041	0.0066	0.0025	0.0062	0.0054	0.0016	0.0035	0.0135	0.0098	0.0137	0.0072
20	0.0009	0.0044	0.0014	0.0018	0.0007	0.0023	0.0023	0.0009	0.0011	0.0019	0.0019	0.0010	0.0054	0.0052	0.0071	0.0063
21	0.0225	0.0792	0.0323	0.0348	0.0177	0.0328	0.0563	0.0206	0.0185	0.0428	0.0122	0.0172	0.1179	0.0815	0.0509	0.0587
22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	0.0173	0.1845	0.0642	0.1817	0.0199	0.0464	0.0737	0.0443	0.0279	0.0467	0.0145	0.0432	0.2754	0.1008	0.0879	0.1116
24	0.0042	0.0252	0.0060	0.0181	0.0044	0.0200	0.0291	0.0055	0.0150	0.0349	0.0046	0.0134	0.1357	0.0550	0.0289	0.0696
25	0.0002	0.0007	0.0155	0.0194	0.0015	0.0023	0.0005	0.0005	0.0005	0.0006	0.0002	0.0009	0.0013	0.0055	0.0043	0.0017
26	0.0031	0.0101	0.0035	0.0059	0.0018	0.0068	0.0042	0.0024	0.0032	0.0096	0.0018	0.0037	0.0130	0.0235	0.0137	0.0513
27	0.0082	0.0381	0.0098	0.0205	0.0106	0.0471	0.0412	0.0163	0.0213	0.0164	0.0168	0.0289	0.0305	0.0487	0.0318	0.0513
28	0.0000	0.0000	0.0020	0.0012	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
29	0.0005	0.0012	0.0030	0.0010	0.0009	0.0025	0.0008	0.0024	0.0007	0.0032	0.0004	0.0012	0.0015	0.0017	0.0043	0.0033
30	0.0272	0.0585	0.0435	0.0407	0.0175	0.1374	0.0640	0.0686	0.1035	0.0753	0.0189	0.2098	0.0698	0.1731	0.1389	0.2420
31	0.0055	0.0164	0.2477	0.0442	0.0617	0.0262	0.0051	0.0170	0.0066	0.0113	0.0031	0.0098	0.0120	0.0325	0.0270	0.0203
COLUMN SUM	1.3383	1.5464	2.1125	1.7594	1.5844	1.7537	1.5503	1.3834	1.8555	1.5357	1.6552	1.5302	2.3310	1.7924	1.6550	2.1146

Continued

SECTORS	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	0.0351	0.0609	0.0076	0.0416	0.0255	0.0432	0.0684	0.0245	0.0027	0.0471	0.0460	0.0348	0.0294	0.2441	0.0221
2	0.3388	0.1178	0.1687	0.0531	0.0393	0.0341	0.0496	0.0870	0.0068	0.0555	0.0052	0.0250	0.0200	0.0112	0.0119
3	0.0053	0.0091	0.0011	0.0061	0.0037	0.0051	0.0067	0.0033	0.0003	0.0054	0.0120	0.0044	0.0029	0.0391	0.0023
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0010	0.0002	0.0000	0.0002	0.0001	0.0003	0.0002	0.0001	0.0000	0.0005	0.0001	0.0001	0.0001	0.0006	0.0001
7	0.0053	0.0011	0.0002	0.0013	0.0010	0.0029	0.0032	0.0007	0.0001	0.0018	0.0003	0.0026	0.0011	0.0014	0.0007
8	0.0001	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0002	0.0000	0.0000	0.0001	0.0001	0.0000	0.0001	0.0000
9	0.0026	0.0011	0.0005	0.0019	0.0014	0.0028	0.0061	0.0011	0.0002	0.0034	0.0002	0.0023	0.0021	0.0009	0.0015
10	0.0144	0.0036	0.0010	0.0055	0.0043	0.0115	0.0033	0.0026	0.0059	0.0054	0.0053	0.0023	0.0313	0.0059	0.0026
11	0.0002	0.0003	0.0000	0.0001	0.0001	0.0003	0.0001	0.0001	0.0000	0.0003	0.0002	0.0040	0.0001	0.0003	0.0064
12	0.0013	0.0006	0.0002	0.0010	0.0017	0.0025	0.0004	0.0004	0.0003	0.0008	0.0029	0.0013	0.0003	0.0007	0.0003
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0004	0.0006	0.0001	0.0004	0.0003	0.0022	0.0007	0.0003	0.0000	0.0005	0.0005	0.0004	0.0003	0.0024	0.0007
15	0.0124	0.0045	0.0147	0.0050	0.0105	0.0187	0.0065	0.0037	0.0054	0.0055	0.0011	0.0065	0.0029	0.0011	0.0020
16	0.0277	0.0009	0.0004	0.0006	0.0006	0.0024	0.0069	0.0018	0.0001	0.0035	0.0002	0.0023	0.0023	0.0006	0.0013
17	1.1086	0.0126	0.0059	0.0101	0.0099	0.0317	0.1079	0.0168	0.0012	0.0571	0.0029	0.0365	0.0361	0.0114	0.0206
18	0.0878	1.5481	0.0175	0.5022	0.1987	0.2098	0.1740	0.0642	0.0069	0.1433	0.0119	0.0720	0.0623	0.0182	0.0434
19	0.0075	0.0122	1.0137	0.0555	0.1197	0.0133	0.0048	0.0235	0.0013	0.0252	0.0130	0.0103	0.0043	0.0029	0.0076
20	0.0063	0.0180	0.0021	1.0177	0.0390	0.0133	0.0034	0.0081	0.0029	0.0130	0.0017	0.0045	0.0020	0.0012	0.0028
21	0.0542	0.0725	0.0450	0.0459	1.0760	0.0889	0.0348	0.2094	0.0102	0.2198	0.0444	0.0851	0.0343	0.0198	0.0663
22	0.0001	0.0004	0.0000	0.0002	0.0001	1.0008	0.0001	0.0000	0.0000	0.0001	0.0001	0.0002	0.0000	0.0000	0.0001
23	0.1186	0.1113	0.0563	0.0787	0.0798	0.1681	1.0606	0.1524	0.0113	0.5317	0.0233	0.3571	0.3541	0.0878	0.2013
24	0.0219	0.0483	0.1589	0.0331	0.0359	0.0202	0.0190	1.1116	0.0143	0.0395	0.0049	0.0912	0.0144	0.0112	0.0083
25	0.0020	0.0046	0.0010	0.0019	0.0014	0.0013	0.0019	0.0052	1.0019	0.0019	0.0006	0.0023	0.0019	0.0034	0.0071
26	0.0241	0.0646	0.0060	0.0230	0.0197	0.0204	0.0257	0.0295	0.0028	1.0312	0.0105	0.0122	0.0207	0.0101	0.0066
27	0.0719	0.0565	0.0100	0.0281	0.0260	0.0311	0.0508	0.0248	0.0056	0.0463	1.1608	0.0800	0.0380	0.0867	0.0168
28	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0004	0.0000	0.0001	0.0005
29	0.0036	0.0042	0.0007	0.0053	0.0045	0.0016	0.0019	0.0035	0.0015	0.0035	0.0057	0.0015	1.0010	0.0044	0.0115
30	0.1177	0.2444	0.0240	0.1637	0.0952	0.1311	0.1754	0.0873	0.0067	0.1392	0.1236	0.0964	0.0732	1.0830	0.0590
31	0.0320	0.0374	0.0046	0.0162	0.0193	0.0198	0.0168	0.0113	0.0009	0.0515	0.0175	0.0092	0.0074	0.0426	1.0647
COLUMN SUM	2.1007	2.4362	1.5403	2.0986	1.8136	1.8776	1.8294	1.8719	1.0893	2.4333	1.4949	1.9450	1.7428	1.6913	1.5684

Table 3.7 Summary of Input-Output Accounts for Orissa, Year 1983-84

Figures in percentage to total

sector no.	sector name	gross output	inter-mediate sales	government current consumption	private consumption	total consumption	invest-ment	export	import	total input	gross value added	depre-ciation	net value added	labour employed
1	agriculture	40.04	16.58	61.96	77.84	77.23	9.53	6.71	6.35	17.64	64.66	35.73	65.82	79.79
2	mining	2.24	5.00	1.42	0.02	0.07	0.68	3.59	0.02	0.98	2.93	0.05	3.04	0.06
3	food	1.71	1.48	0.00	2.93	2.01	0.58	0.02	2.22	3.05	0.54	0.64	0.53	0.07
4	beverages	0.03	0.04	0.00	1.02	0.90	0.01	0.00	2.76	0.06	0.02	0.02	0.02	0.00
5	tobacco	0.23	0.00	0.00	0.04	0.01	0.01	0.00	1.14	0.29	0.19	0.01	0.20	0.01
6	cotton	0.73	0.52	0.00	3.93	3.77	0.47	0.43	0.77	1.34	0.40	1.37	0.36	0.06
7	jute	0.09	0.71	0.00	0.00	0.00	0.03	0.00	0.91	0.10	0.09	0.20	0.00	0.02
8	misc.textiles	0.04	0.26	0.00	1.31	1.26	0.00	0.00	4.00	0.04	0.04	0.01	0.04	0.00
9	wood	0.23	1.63	0.37	2.60	2.59	0.00	0.00	9.59	0.51	0.07	0.11	0.07	0.04
10	paper	1.30	0.61	0.11	0.01	0.02	0.24	0.03	0.00	3.02	0.40	2.00	0.42	0.19
11	leather	0.02	0.14	0.00	0.05	0.05	0.00	0.00	0.35	0.03	0.01	0.00	0.01	0.00
12	rubber	0.07	0.24	0.06	0.26	0.25	0.06	0.03	0.00	0.11	0.05	0.03	0.05	0.00
	total of agro-based manufacturing	4.53	5.63	0.54	13.01	12.53	1.40	9.10	30.61	9.36	1.09	4.47	1.79	0.40
13	petroleum & coaltar	0.00	6.31	0.00	0.79	0.76	0.00	0.00	14.62	0.00	0.00	0.00	0.00	0.00
14	fertiliser	0.46	3.01	0.01	0.00	0.00	0.17	0.00	5.10	0.05	0.24	1.60	0.10	0.01
15	chemicals	0.41	2.50	3.23	2.57	2.60	0.35	0.00	10.62	0.70	0.22	1.03	0.10	0.03
16	cement	0.04	0.34	0.00	0.00	0.00	0.99	4.24	0.00	1.03	0.30	1.02	0.27	0.01
17	non-metallic mineral	1.65	4.52	0.00	0.34	0.33	1.11	3.27	4.11	3.45	0.66	2.50	0.50	0.11
18	iron & steel	11.34	11.07	0.00	0.00	0.00	10.33	41.77	0.00	24.45	4.17	9.93	3.94	0.30
19	basic metal(non ferrous)	0.45	0.00	0.00	0.00	0.00	2.67	0.67	2.06	0.09	0.20	0.16	0.21	0.01
20	metal	0.16	2.36	0.70	0.03	0.06	0.21	0.02	4.13	0.26	0.10	0.30	0.09	0.02
21	machinery	0.61	6.63	1.19	0.04	0.09	0.56	0.05	10.46	1.44	0.15	0.92	0.12	0.04
22	misc.manufacturing	0.01	0.72	0.03	0.29	0.20	0.01	0.00	2.21	0.01	0.01	0.04	0.00	0.00
23	construction	9.30	1.90	0.00	0.00	0.00	51.00	0.00	0.00	14.00	6.42	5.72	6.45	11.49
24	electricity	1.70	4.05	0.24	0.32	0.32	7.57	0.00	0.05	1.62	1.74	7.94	1.50	0.36
25	gas works	0.24	0.20	4.00	0.05	0.24	0.09	0.00	0.02	0.07	0.33	1.25	0.29	0.00
	total of non-agrobased manufacturing *	29.47	51.97	11.00	4.46	4.74	76.53	53.60	62.10	51.43	17.45	32.63	16.05	13.32
	total of manufacturing	34.00	57.60	12.34	17.47	17.27	78.01	62.79	92.00	60.79	19.34	37.10	18.63	13.72
26	railway	1.95	2.46	0.00	0.20	0.19	2.92	3.00	0.00	2.70	1.50	9.60	1.17	0.73
27	transport	5.62	5.56	11.60	1.13	1.54	7.62	12.06	0.00	0.47	4.06	0.63	3.00	1.21
28	storage & water supply	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.03	0.00	0.00
29	communication	0.32	0.39	0.00	0.29	0.20	0.63	0.00	0.30	0.12	0.43	0.95	0.41	0.13
30	trade & hotels	0.59	13.00	14.03	2.09	3.33	0.40	14.35	0.00	9.55	0.06	5.05	0.10	4.25
31	banking	1.40	3.43	0.00	0.10	0.17	0.00	0.30	0.00	0.65	1.93	2.03	1.90	0.17
	total of services	17.96	25.90	25.71	4.69	5.50	12.46	30.51	0.05	21.56	15.99	27.17	15.55	6.49
	gross total	100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100	100.00	100.00	100	100.00

continued

Sectoral Capital Coefficient for the Orissa State, Year, 1983 : Summary.

Sector No.	Const-ruction	Machinery	Finished Goods	Rawmaterial	Total
1	0.0209	0.2933	0:5752	0.0086	0.8979
2	0.7708	1.0747	0.0153	0.1391	2.0000
3	0.0294	0.0591	0.1018	0.0589	0.2491
4	0.1705	0.3611	0.1122	0.1596	0.8034
5	0.0046	0.0095	0.0215	0.0593	0.0949
6	0.0669	0.2521	0.1113	0.0924	0.5227
7	0.2509	0.6332	0.1433	0.1100	1.1115
8	0.1197	0.2423	0.0499	0.0734	0.4853
9	0.0317	0.0604	0.2366	0.1356	0.4644
10	0.0356	0.1315	0.0201	0.0620	0.2492
11	0.0157	0.0194	0.0598	0.0441	0.1389
12	0.0568	0.1398	0.1729	0.0970	0.4666
13	0.7566	0.7991	0.0883	0.0665	1.7105
14	0.1335	0.8707	0.1668	0.3443	1.5152
15	0.1784	0.5311	0.1764	0.0288	0.9147
16	0.0558	0.1001	0.0472	0.1410	0.3441
17	0.0683	0.1858	0.0860	0.2194	0.5594
18	0.3400	1.2121	0.3250	0.1380	2.0200
19	0.0253	0.0551	0.0236	0.1682	0.2823
20	0.1045	0.2581	0.1371	0.0276	0.5274
21	0.5200	2.7393	0.2393	0.2220	3.5100
22	0.6035	1.1772	0.1079	0.0832	1.9718
23	0.0713	0.0715	0.0713	0.0088	0.2230
24	0.3033	3.2192	0.0546	0.1088	3.6859
25	0.0112	0.0521	0.0000	0.0033	0.0666
26	1.9052	2.6464	0.0022	0.0250	4.5788
27	0.1105	1.6640	0.0045	0.0047	1.8837
28	1.3481	0.8378	0.0405	0.0363	2.2627
29	1.4277	0.2086	0.0000	0.0340	1.6704
30	0.2737	0.0603	0.0119	0.0712	0.4170
31	0.7954	1.0035	0.0252	0.0045	1.8286

Chapter 5

LINKAGE ANALYSIS

Input-output tables are made of numerical elements which enable us to obtain precise quantitative values in multiplier analysis. A good many applications of input-output analysis are aimed at obtaining these quantitative results. However, the qualitative properties of input-output tables are related to many important economic problems. In this context, "linkage analysis", otherwise known as structural analysis, is concerned with the qualitative properties of input-output system.

5.1 Linkage Analysis

Recently the concept of "Linkage analysis" has attracted considerable interest as a measure of identifying "key sectors of growth" in a strategy of industrial development. This idea is very much useful for the developing economies where the resources are limited. The idea has also been taken up by regional economist who see it as a measure of identifying industries or sectors which might be suitable for selective promotion within the context of a regional industrial development programme. It is believed that output, income and employment in a region would grow more rapidly if most of the resources were concentrated in the key sectors than if these resources were allocated in some alternative ways.

A free market economy is often characterised by cyclical fluctuations of business activities. Although business cycles

were observed in the pre-industrialisation era, the amplitude of fluctuations widens as the inter dependence among the producing sectors of an economy becomes intensified. In the absence of economic interdependence, fluctuations would be mild and short lived.

Further, in an economy, not every industry is related to all other industries in the same way. Some industries rely on a good many other industries while some do business only with a few other industries. In other words, changes in some of the industries may yield greater repercussion effects than other sectors on the economy It may be necessary that we keep a close eye on those industries which are likely to exert important influences on the economy such that appropriate measures may be taken in advance to direct undesirable economic fluctuations.

According to Saxena (1987), "for the sake of comparison, it is also desirable to know the similarities and differences of the production pattern of the different economies and sectors. Linkage measure throws light on the characteristic feature of an economy in nutshell".

One of the objectives that all less developed countries/ regions have set themselves, is rapid growth of income per head and rising incomes are associated, in both the time series and cross-section studies, with a rising share of industry in gross domestic product. The industrialisation process can be carried out in a number of ways but each new industry would offer opportunities for other suppliers i.e backward linkages and

provide inputs for utilisation by other users i.e forward linkages. These backward and forward linkages are not reflected in market prices and therefore represent an externality, which could cause the social benefit of an investment to diverge from the private benefits. "If, furthermore we are prepared to assume a common set of relative prices, a common structure of distribution of income and common set of technology for each sector across the countries (regions), consistent with the eventual emergence in each less development countries (LDC) of the structure of demand to be found in developed countries, then we could select our key industrial sectors for promotion by reference to the backward and forward linkages found in LDCs" (Boolmer Thomas, 1988).

5.2 Rassmusen's Linkage Indices

In the input-output literature, there are several kinds of linkage measures suggested by many input-output economists (Saxena, 1990). Among them, Rasmussen's measures based on the Leontief inverse coefficients have been widely used. In the present study, only Rasmussen's type backward and forward linkage indices have been estimated in this chapter. Based on these linkage measures, various sectors of Orissa economy have been grouped into usual four categories of final manufacturing, final primary, Intermediate primary and intermediate manufacturing type.

Linkage indices based on Leontief's inverse matrix has been developed by Rasmussen (1953) in a study of structural change. There are two main reasons for using Rasmussen's indices :

(a) By using the inverse matrix, these indices take into account the direct as well as indirect output effects of an economy.

(b) They are properly weighted in comparison to other measures and therefore, more correctly depict the importance of strategic sectors of the economy.

To simplify Rasmussen's Linkage indices, let us consider B as the static Leontief's inverse matrix with b_{ij} as its elements. The coefficient b_{ij} can be interpreted as the increase in the output in industry i per unit increase in the final demand for the product of industry j. An index of Backward linkage (U_j) that Rasmussen calls "the power of dispersion" is defined as the following :

$$U_j = \frac{1/n \sum_{i=1}^{n} b_{ij}}{1/n^2 \sum_{i=1}^{n} \sum_{j=1}^{n} b_{ij}}$$

where 'U_j' is interpreted as the total increase in the output from the whole system of industries needed to cope up with one unit increase in the final demand to the product of jth industry

Similarly, an index of forward linkage (U_i) is defined by him as

$$U_i = \frac{1/n \sum_{j=1}^{n} b_{ij}}{1/n^2 \sum_{j=1}^{n} \sum_{j=1}^{n} b_{ij}}$$

values of β_1 and β_2 will be equal to one. Therefore, if the estimated value of Uj for a sector is less than one, then the sector has low backward linkage and it is called as primary sector. Similarly, if Ui is less than one then it is called as final sector. Thus, the sector will be located in the final primary quadrant in the Table 5.2 and 5.3. This way the reasoning can be extended to all other sectors. In case of the dynamic model, above procedure remains the same but with the difference that dynamic inverse is used in the place of static inverse.

5.3 Technical Structure of the Orissa State's Economy

5.3.1 Static and Dynamic Production Structures of Orissa

The above four fold classification of various sectors for the static and dynamic models, discussed in above, have been provided in the Table 5.2 and 5.3, respectively.

From the Table 5.2, it can be seen that in the static model, there were twelve sectors which had comparatively high backward and low forward linkages. In otherwords, they were in the final manufacturing category. These sectors were food, beverages, cotton, wood, leather, coaltar, fertilizer, chemicals, cement non metallic minerals, metal products and machinery.

In case of the final primary category, there were eleven sectors. They had comparatively low backward linkages as well as low forward linkages. These sectors were tobacco, jute textiles, miscellaneous textiles, paper, rubber, basic metal alloys, miscellaneous manufacturing, gas, storage,

TABLE 5.2 TECHNICAL STRUCTURE OF ORISSA ECONOMY (STATIC)

STATIC INPUT-OUTPUT MODEL	FINAL LOW FORWARD LINKAGE Ui < 1	INTERMEDIATE HIGH FORWARD LINKAGE Ui ≥ 1
MANUFACTURING HIGH BACKWARD LINKAGE Uj ≥ 1	FOOD, BEVERAGES, COOTTON, WOOD LEATHER, COALTAR, FERTILISER, CEMNT, NON-METALLIC MINERALS, METAL, MACHINERY, CHEMICALS	IRON & STEEL, TRADE, CONSTRUCTION
PRIMARY LOW BACKWARD LINKAGE Uj < 1	TOBACCO, JUTE, MISC.TEXTILES, PAPER, RUBBER, BASIC METAL, GAS MISC.MANUFACTURING, STORAGE, COMMUNICATION, BANKING	AGRICULTURE, MINING, ELECTRICITY, RAILWAY, TRANSPORT

TABLE 5.3 TECHNICAL STRUCTURE OF ORISSA ECONOMY (DYNAMIC)

DYNAMIC INPUT-OUTPUT MODEL	FINAL LOW FORWARD LINKAGE Ui < 1	INTERMEDIATE HIGH FORWARD LINKAGE Ui ≥ 1
MANUFACTURING HIGH BACKWARD LINKAGE Uj ≥ 1	FOOD, BEVERAGES, COOTTON, WOOD COALTAR, FERTILISER,CHEMICALS, CEMENT, NON-METALLIC MINERALS, METAL, MISC.MANUFACTURING, RAILWAY, COMMUNICATION, STORAGE	IRON & STEEL, MACHINERY, CONSTRUCTION, ELECTRICITY, TRADE
PRIMARY LOW BACKWARD LINKAGE Uj < 1	TOBACCO, JUTE, MISC.TEXTILES, PAPER, RUBBER, BASIC METAL, GAS LEATHER	AGRICULTURE, MINING, TRANSPORT, BANKING

communication and banking for the static model.

Only three sectors, namely , iron, construction and trade sectors were having comparatively high backward and forward linkages in the static model. In otherwords, these three sectors were of intermediate manufacturing type.

On the otherhand, five sectors, namely, agriculture, mining, electricity, railway and transport were having comparatively low backward but high forward linkages. Thus, they were in the intermediate primary category.

In case of the dynamic model, there were fourteen sectors in the final manufacturing category. These were food, beverages, cotton, wood, coaltar, fertiliser, chemicals, cement, non-metallic minerals, metal products, miscellaneous manufacturing, railway and storage(See Table 5.3)

With respect to final primary category, there were eight sectors in the dynamic model. These were tobacco, jute, paper, leather, rubber, basic metal, gas, and miscellaneous textiles.

Only five sectors, namely, iron and steel, machinery, construction, electricity and trade were of intermediate manufacturing type.

Only, four sectors agriculture, mines, transport, and bank were in the intermediate primary category.

Comparing the static and dynamic model, it was observed that overall structure of Orissa economy did not show any drastic change in the dynamic structure of production. Most of the manufacturing sectors of Orissa economy were observed in the final categories. There are two observations which can be inferred from this situation:

(i) the inter-industry linkage relation is not much intense, and (ii) inadequate capital to output ratios exist across the sectors in Orissa economy.

Finally, with respect to the key sectors of growth, which are intermediate manufacturing type (i.e. high backward as well as high forward linkages), there were only five sectors namely, iron, construction, machinery and electricity and trade in the dynamic model. These sectors were found having higher output multipliers in the preceding chapter. A few number of manufacturing sectors in this category indicated the under-developed nature of the Orissa state. Usually, in a developed economy there are higher number of sectors in this category.

5.3.2 Economic Development and Structure of Orissa Economy

The relationship between economic progress and structure of an economy is well founded in development economics literature. According to Rostow's growth theory, the structure of an economy changes through various stages, from traditional to modern high mass consumption stages. The traditional structure of an economy was based on primitive mode of production. Modern facilities of science and technology were absent in this primitive stage of an economy. The economic activities, dominated by underdeveloped agriculture sector were carried out with simple tools and implements. The size of manufacturing sector was very much insignificant in this traditional economy. As such, there were hardly any backward or forward linkages between agriculture, manufacturing and service sectors in this traditional economy.

But with gradual economic progress, the mode of production changes across the sectors agriculture, manufacturing and services. New production functions appear in these sectors as development gains its momentum. The agriculture sector becomes commercialised and starts using of modern inputs such as machinery, fertiliser and infrastructure. Similarly, new industries including agricultural processing units and machinery sectors come up in the manufacturing sectors. Infrastructure sector starts growing due to greater dependence of agriculture and manufacturing sectors on its service inputs. As a result, interindustry backward and forward linkages improve with gradual economic progress.

In this regard, Rassmusen's structural analysis of an economy, depicted by four fold classification of sectors, enable us to know the degree of economic progress in a qualitative manner through each sector's backward and forward linkage indices. It also enable us to judge the impact of our several years of planned economic efforts on the structural conditions of the economy. Because, the structure of an economy at a point of time is the result of gradual economic progress achieved through numerous measures undertaken in the past years.

In view of above ideas, we may be able to deliver our judgments on the technical structure of our concerned Orissa economy, pertaining to the year 1983-84, by analysing sectoral backward and forward linkage indices. First, a sector's backward linkage reflects on its mode of production. Relatively

high backward linkage indicates its greater technical dependence with rest of the sectors in the economy. Greater technical dependence arises when a sector uses many inputs from different sectors or very high amount of specialized inputs from few selected sectors. On the otherhand, a sector's forward linkage reflects on the dependence of rest of the sectors of the economy on this sector. A relatively high forward linkage of a sector indicates that a large number of sectors depend on this sector in the economy or few related sectors with greater dependence upon this sector exist in the economy. However, in an economy some sectors are generally expected to have either high backward or high forward linkage with other sectors by the nature of their technology. But with economic development, if they improve both types of linkage, then we can say that these sectors are progressing. For an instance, service sectors such as railway, road transport, communication, and banking sectors are expected, from technical point of view, to have low backward linkage in the initial stage of development because they depend on few inputs lke machinery, metal products, and construction. But a large number of sectors depend upon these sectors for infrastructure services and thus, they could have comparatively high forward linkage with all other sectors in a planned economy. But with economic progress, these sectors are expected to improve their technical backward dependence with other sectors. They have to improve their technology in order to provide quality services to other sectors. Low quality infrastructure sector may not attract the investors to take production risk in a region. In the Orissa state, we have found

transport, storage, banking, and communication sectors with comparatively, high forward or low backward linkages but not both the linkages. Therefore, it may be inferred that over a long period of planned efforts in the country, these sectors have not developed in a qualitative sense. On the other hand, transport, and railway sectors linkages have not been stronger in comparision to other sectors of the Orissa economy.

With respect to agriculture sector, its relatively low backward linkages indicated that this sector has not been technically much developed. An underdeveloped agriculture indicates lack of commercialisation and diversification of its activities. A technically underdeveloped agriculture affects both the backward and forward linkages of agro-processing units. Within agro-processing sectors, some sectors such as food, beverages and wood sectors by nature produce output for final consumption only. Thus, they are expected to have relatively high backward but low forward linkages and we find the same in our Orissa economy. But other sectors such as cotton, jute, misc.textiles, leather, paper and rubber, which depend upon agriculture and its allied sectors (such as plantations, animal husbandry, fishing and forestry), are expected to have high backward as well as high forward linkages because these sectors are also closely related to non agricultural industries, particularly for industrial packaging, and most of the sectors in an economy are expected to depend upon these sector for above purpose. Since the agriculture sector is technically backward, these sectors are not able to

composition of different components of final demand represented by consumption, export and import etc. Among the final demand components, consumption comprising of private as well as public consumption form the major part and trade comprising of export and import form comparatively, smaller part of final demand. However, the trade component has recently drawn comparatively more attentions from economists because of increasing size of trade and government's policy measures in all economies across the world. In an underdeveloped Orissa state too, there has been special efforts to promote the external trade sector. For this purpose, the Orissa government has set up a Directorate of Export Promotion and Marketing in the state. In view of this, we have left the consumption part for further studies and taken up a separate chapter to evaluate the impact of trade sector on the level of output, income, and employment of the Orissa state. The next chapter 6 has dwelt on this issue.

Chapter 6

REGIONAL TRADE

Introduction

Economists from different schools of thought have recognized that foreign trade can significantly influence the level of some of the main economic activities such as output, income, and employment in an open economy. In India, an export led growth strategy has been the focal point of our national level policy since the inception of planning era. In Orissa state too, the state government has undertaken concerted efforts to step up export of commodities from the region to overseas countries as well as to other regions within India. The logic behind such policy has been that domestic demand for commodities may not be sufficient within the region and export of commodities by increasing the size of the demand could increase production, income, and employment opportunities within the region. However, the state has not taken up any measures to curb labour and income intensive imported goods particularly, agro-processing products. There has not been any attempt to increase supply of these commodities though the state is dominated by agriculture as the main occupation of the people, and characterized by abundant supply of labour. Instead, the state has been exporting some minerals, and metal alloys like iron & steel, aluminium etc. Given the fact that the state has been suffering from high poverty, unemployment,

and low percapita income, it is curious to see how the observed trade pattern does matter to the state in terms of its contribution to state's output, income, and employment. The present chapter has taken an effort in this regard within input-output framework.

6.1 Theory of Trade and Input-Output Method

The impact of foreign trade on the domestic economy depends to a large extent on the commodity structure of exports and imports besides other important factors such as tariffs, exchange rate, and prices. Hence, a multisectoral input-output approach to trade is very much essential to assess the impact of sectoral composition of export of commodities on the economy as a whole.

Any attempt to evaluate the impact of trade sector needs to begin with a discussion on the treatment of exports and imports in the economic theory. Economists have been holding different views on the role of exports and imports. Early Merchentalists viewed all exports as advantageous since they increased the stock of gold, Per Contra, all imports are treated as reduction in wealth as they involved drain of gold stock. The classical economist Ricardo argued that it is the comparative advantage in terms of labour value that determines the gains (production and consumption gains) from trade to an economy. The Neoclassical economists explained that it is the production technology conditioned by factor abundance that determines the pattern and gains from trade. The famous Heckscher-Ohlin theory in this regard suggested that labour abundant countries export labour intensive commodities

and capital abundant countries export capital intensive commodities. The Keynesian macroeconomics, in terms of effective demand concept, visualized all exports as inducement and all imports as leakages to an open economy.

Input-Output economist Prof. W. Leontief held an intermediate position between the Neoclassicals and Keynesians. He recognized neoclassical's technology argument. But at the same time he argued that the neoclassical's technology approach to trade considered only the direct labour to output and capital to output coefficients of production in conceptualizing the gains from trade. However, a sector's direct labour content may be low and capital content may be high in relation to other sectors but its total labour content i.e direct plus indirect labour contents, may be quite high, and total capital content may be low in comparison to other producing sectors. In that case, that sector's export is labour intensive though it looked capital intensive on the basis of direct coefficient. This idea of Prof. Leontief constituted the popular "Leontief Paradox" in trade theory. Prof. Leontief demonstrated this thesis using the input-output method in his study of the US economy in 1936. Similarly, he held Keynesian posture on export and import but argued that the commodity structure of exports and imports as well as the production technology determine the output, income and employment gains for an economy. The input-output method can be explained as follows :

Suppose we have an economy fully-dependent upon trade sector, and we have observed two vectors, one for export of commodities by various sectors and one for import of various commodities for this economy. Also we have the knowledge of the interindustry technical coefficient matrix characterizing the interdependence of the sectors within the region, denoted by A, for this trading economy. The input-output equation system for this trading economy can be written as the following:

$$X = A.X + E - M \qquad (6.1)$$

in which we have the expressions X, A, E, and M respectively, for gross output vector, technical coefficient matrix, export vector, and import vector. Now the total impact of only export on output of various sectors can be estimated in the following way:

$$X_e = (I-A)^{-1}E = B.E \qquad (6.2)$$

and the sum of output of all sectors due to export sector can be written as

$$i.X_e = i.(I-A)^{-1}E = i.B.E \qquad (6.3)$$

where i is summation vector, X_e is vector of sectoral output due to export, B is the usual Leontief matrix. Similarly, if we want to produce import within the economy, then the total impact of import can be calculated by premultiplying the inverse matrix with the import vector:

$$i.X_m = i.B.M \qquad (6.4)$$

Now if we are given two row vectors, one for sectoral value added to output coefficients and another for labour to output coefficients, then we can estimate the level of total income (V_e) and employment (L_e) due to export :

$$V_e = (v_1, v_2 \ldots\ldots v_n).X_e \qquad (6.5)$$

$$L_e = (L_1, L_2 \ldots\ldots L_n).X_e \qquad (6.6)$$

Similarly we can also find the income (V_m) and employment (L_m) impact of import sector as given below:

$$V_m = (v_1, v_2 \ldots\ldots v_n).X_m \qquad (6.7)$$

$$Lm = (L1\ 12\ldots\ldots Ln).Xm \qquad (6.8)$$

for analytical purpose, we can derive certain ratios by dividing the total output, income, and employment impact of export and import sector by the observed level of gross output (X), income (V), and employment (L) of the economy as whole.

The total factor intensity of trade indicates the inputs of labour, and capital associated with one unit of export, and import. It can be explained in the following way:

Let, we have the labour and capital requirement per unit of output for various sectors, respectively,

$$L = (L_1, L_2, L_3 \ldots\ldots L_n) \qquad (6.9)$$

$$K = (K_1, K_2, K_3 \ldots\ldots K_n) \qquad (6.10)$$

If the export sector has to produce output vector X_e, then the total capital and labour requirements will be respectively,

$$L_e = (l_1, l_2 \ldots\ldots L_n).X_e \qquad (6.11)$$

$$K_e = (K_1, K_2 \ldots\ldots K_n).X_e \qquad (6.12)$$

After estimating total labour (L_e) and capital (K_e) requirement of export sector, we can divide these figures with total value of exports and can get the labour, and capital intensities of one unit export in value terms. This can be explained in the following way:

$$l_e = L_e/(i.E) \qquad (6.13)$$

and

$$k_e = K_e/(i.E) \qquad (6.14)$$

where l_e and k_e denote for labour, and capital intensities respectively. Similarly, we can find out the labour and capital required to produce output due to import X_m by using above procedure and let us denote them as L_m and K_m. In the same way as explained in above for the case of export, we can also get the total labour, and capital intensities of import, as l_m and k_m, respectively.

Now comparing the labour and capital requirements of the export and import sector, if we find that l_e is less than l_m, and also k_e greater than k_m, then we can say that Leontief paradox holds true for the labour abundant Orissa economy.

Finally, if we want to evaluate the dynamic effects of export and import, then the procedures outlined in above would remain same but with the dynamic inverse, as defined earlier in the chapter 2, in the place of static inverse in above calculations. The logic behind introducing the dynamic inverse is like this: when export takes place, it increases output through several rounds and in each round, they require additional capital, and further, this additional capital require to produce more output, and the process goes on. Similarly, the reasoning also can be extended to import leakages.

6.2 Impact of External Trade on Orissa Economy

6.2.1 Trade Pattern in Orissa State

In the Orissa state, total value of export formed approximately, 12.8 percent of its state domestic product in the year 1983-84. But few sectors dominate the export sector in this region. On the other hand, total value of imports formed 18 percent of its state domestic product. Therefore, there was negative trade balance of 5 percent. However, this is only the direct effect. We will examine, shortly, its total impact on the economy in our next section. In chapter 2 we have discussed the structure of total export, and import for the Orissa economy. In the following, let us have a different look at the structure of export and import.

A relevant way of looking at the importance of sectoral trade pattern is to relate each sector's export and import figures to the domestic demand figure of that sector's output. Such a relation would reveal which exports are taking place due to inadequate demand for the commodities within the region on the one hand and which imports are taking place due to high domestic demand (or inadequate domestic supply). In this regard, Table 6.1 presents sectoral trade pattern in the Orissa state.

From the Table 6.1, it can be seen that export of paper sector's output formed 423 percent of Orissa's demand for the output of that sector, and in a similar way of expression, it was followed by major exporting sectors such as cement 191 percent, iron & steel 91 percent, transport services 38

6.2.2 Impact of Trade on Total Output, Income, and Employment

Table 6.2 provides us the impact of net trade sector on output, income, and employment level of Orissa economy in comparison the observed level of output, income, and employment in the year 1983-84. It can be seen from this table that impact of net trade i.e impact of export minus impact of import, on output, income, and employment in both the static and dynamic cases were negative. The impact of net trade on output was equivalently (-) 4.83 percent of gross output in the year 1983-84, in view of the static model and similarly, (-) 3.21 percent for income, and (-) 7.46 percent for employment.

In view of the dynamic model, the impact of net trade was negative to the tune of (-) 5.77 percent of Orissa state's gross output, (-) 3.76 percent of gross income, and (-) 8.26 percent of gross employment in the year 1983-84.

Table 6.2 : Impact of net trade on output, income and employment in Orissa, Year 1983-84

	Static Model	Dynamic Model
	Figures in Percentages	
Output	-4.83	-5.77
Income	-3.21	-3.76
Employment	-7.46	-8.26

The impact of export and import has been indicated in the Table 6.3. From this table, it can be seen that contribution of export sector, in view of the static model, could be to the tune of 19.66 percent of the level of gross output, 12.21 percent of income, and 3.99 percent of employment in the year 1983-84. In view of the dynamic model for the same year, the

contribution of export could be 23.67 percent, 14.61 percent, 5.81 percent, of output, income, and employment, respectively.

On the other hand, if the imports were produced within the region in that year, then the impact of import could have been to the tune of 24.49 percent of output, 15.42 percent of income, and 11.45 percent of employment, in terms of the static model. In view of the dynamic model, the impact of import on output, income, and employment could have been, respectively, 29.45 percent, 18.37 percent, 14.07 percent.

Table 6.3 : Impact of export and import on output, income and employment in Orissa, year 1983-84

	Export		Import	
	Static	Dynamic	Static	Dynamic
Output	19.66	23.67	24.50	29.45
Income	12.21	14.61	15.42	18.37
Employment	3.99	5.81	11.45	14.07

Note : Figures are in percentages to total in the economy

6.2.3 Factor Intensity of Trade

It can be seen from this table that labour intensity of export, in view of the static model was 5 persons per one hundred thousand rupee value of export but for import the figure was 9. This implies that if one hundred thousand rupee transaction takes place for both export and import in the Orissa state, then there would be a loss of employment of 4 persons.

The capital intensity of export sector was 2.68 rupees per one rupee export while for import the figure was at 2.06, in terms of the static model. It implies that per hundred thousand

rupee value of export and import transaction, there would be a loss of capital by an amount of sixty two thousand rupees.

In view of the dynamic model, labour intensity of export, was estimated at 7 persons per one hundred thousand rupee value of export but for import the figure was 11. This implies that if one hundred thousand rupee transaction takes place for both export and import in the Orissa state, then there would be a loss of employment of 5 persons.

The capital intensity of export sector was 3.20 rupees per one rupee export while for import the figure was at 2.46, in terms of the dynamic model. It implies that per hundred thousand rupee value of export and import transaction, there would be a loss of capital by an amount of seventy four thousand rupees.

Table 6.4 : Factor intensity of trade

	Export		Import	
	Static	Dynamic	Static	Dynamic
Labour Intensity	5.00	7.00	9.00	11.00
Capital Intensity	2.68	3.20	2.06	2.46

Note : labour intensity indicates the number of persons per one hundred thousand rupee value of export and similarly for import. Capital intensity indicates number of rupees per one rupee value of export and similarly for import.

After looking at the factor intensity of export and import, it can be inferred that the `Leontief Paradox' holds good for the trade sector of Orissa state. Because Orissa is importing labour-intensive good though it is labour abundant

region and exporting capital intensive good though it is capital scarce region.

6.3 Concluding Remarks

The above results indicated that there were substantial loss of output, income, and employment accruing from the existing pattern of trade of Orissa state. Unless the planners of Orissa state take steps to reduce imports by stepping up the production of commodities (particularly, of relatively more labour intensive agro-processing products) within their boundary, there could not be any gain from trade to this state.

Lastly, we have so far touched upon the impact of structure of production, of capital, and of trade on important macro indicators such as output, income, and employment levels of Orissa state on the basis of our data base pertaining to the year 1983-84. However, it is likely that the structure of production may change over time. In that case our results could be subject to modification if some perceptible changes in the technical structure of Orissa economy occur at a future time period. In view of this, an attempt has also been made in our next Chapter 7 to grasp about technical changes of Orissa economy on the basis of some latest information which were available for the year 1992-93.

Chapter 7

UPDATED REGIONAL INPUT-OUTPUT COEFFICIENT MATRIX FOR ORISSA (FOR THE YEAR 1992-93)

Explaining economic growth has been a topic for long. Technological development is widely considered to be one of its driving forces [1]. In a single production process, technological development expresses itself in the productivity growth of the primary factors, and in the substitution between the intermediate goods and services. As a consequence, the input coefficients corresponding to this production process are changed. In a multi-sectoral input-output framework, these two components interact for all sectors simultaneously affecting the entire matrix of input coefficients.

7.1 A Case for Structural Change

In input-output analysis, it is usually assumed that the production structure of the economy characterized by input-output coefficients do not change in the short-run. But in reality, several factors such as changes in relative prices of inputs, changes in technology and changes in economic policies may lead to structural changes in the economy, even in the short-run or a planning period. Besides in the process of growth, new industries may come up and accentuate dependence between industries in an economy.

The economic scenario in India has gone through several changes in the last decade. During 1980s, liberalization measures were initiated in order to facilitate modernization and capacity expansion programmes of industries in the private sector. More recently, government of India have declared New Economic Policy in 1991 in the wake of growing fiscal deficits, balance of payment crisis, inflation and sluggish growth rate of the Indian economy. In this policy, government have reversed the last forty years old legacy of socialist planning process in the country. The role of giant public sector has been slackened and greater responsibility has been cast in favour of the private sector. The economy has been set to be guided by market forces. Structural adjustment and stabilization measures have been undertaken for creating a market friendly system in the country. A large number of government induced entry restrictions and licensing requirements in the industry and trade sector have been eliminated. On the other hand, stabilization measures have been undertaken for consolidating government's fiscal position and for reducing unproductive expenditure.

Since, the fate of constituent states in India largely depends on central government's policy changes, it was felt necessary by this study to forecast a new input-output technology matrix and thereby, examine if there could have been perceptible changes in the technical structure of Orissa economy during the last decade. A non-Survey type RAS method has been followed for updating our base year input-output table of Orissa economy for the year 1983-84 on the basis of latest

summary data available for manufacturing and other important sectors for the year 1992-93. Since it is a non survey approach to forecasting of the technical structure of an economy, we could be able to deliver only the tentative judgments.

7.2 RAS METHODOLOGY

7.2.1 Theory of RAS Methodology

In the input-output literature, there have been several non-survey approaches to forecast structural change of an economy [2]. Among them, RAS method, originated by Stone (1963) is well known and widely used as a technique for updating input-output coefficients matrix. Empirically, this technique has been found to be more efficient than other non-survey techniques for explaining the structural change of an economy (Morrison and Smith, 1969).

The RAS method is based upon two fundamental determinants of structural change such as (i) productivity effect, and (ii) substitution effect. Let us postulate S_j as the productivity effect upon the coefficient changes of sector j, applying uniformly along the column j of input-output coefficient matrix A. This productivity effect reflects that more output could be produced per unit of primary inputs in nominal terms. It can, therefore, be interpreted as the productivity change of the joint primary inputs. By applying S_j to each element a_{ij} in the column j of A, it is implicitly assumed that the mix of inputs in sector j remains constant. Hence, S_j actually measures the average effect. Next, r_i is postulated as the average substitution effect of a commodity `i', applying

uniformly along the row i of A. This effect is the average of the substitutions between intermediate inputs that have occurred in all sectors. It may be either a mere average of all substitutions regarding the commodity 'i' or economy-wide changes in prices or the use of certain inputs or both.

When both r_i and S_j are applied simultaneously to a base year input-output coefficients matrix A_o, we obtain

$$A_t = \hat{r}\, A_o\, \hat{S} \qquad (7.1)$$

in which $\hat{r}$ and $\hat{S}$ are the diagonal matrices of r_i and S_j coefficients (i, j = 1,...,n) respectively.

Since both the effects are average effects, they should correctly reflect the average changes as they have occurred in each row and column. In other words, they should satisfy the condition that the observed row and column sums are equal to the ones obtained from the forecasted matrix $\hat{A}_t$. Let us denote the observed row sums of A_t by $U_{i,t}$, then

$$A_t\, e = U_{i,t} \qquad (7.2)$$

in which e is unit column vector, i refers to sector i and t for current year under consideration. Also, let us denote the column sums of A_t by $V_{j,t}$, then

$$e/\, A_t = V_{j,t} \qquad (7.3)$$

The conditions now read as follows:

$$\hat{r} A_o\, \hat{S} e = U_{i,t} \qquad (7.4)$$

$$e/\, \hat{r}\, A_o\, \hat{S} = V/_{j,t}$$

where e/ is the unit row vector.

The two conditions in above entail a set of 2n equations to solve for the 2n elements of $\hat{r}$ and $\hat{S}$, under the pre-condition

we can stop the iteration. Otherwise, we will have to go for another iteration. In this way, row and column adjustment procedure goes on and we may have to run a number of iterations. In our study, ten iterations were conducted after ending up with the rows. At this stage, the error of row sum was within five percent limit for various sectors. The errors have been reported in Table 7.1.

7.2.3 Data Requirements

The RAS technique requires three sets of informations pertaining to the current year such as (i) sectoral gross output levels, (ii) either sectoral value added or gross intermediate purchases, and (iii) either sectoral final bills or sectoral intermediate sales. The present study was able to collect first two sets of data i.e sectoral gross output and value added figures for the registered manufacturing sectors of Orissa state from the report of Annual Survey of Industries. Summary Results (1992-93) of the Central Statistical Organization of Govt. of India. For agriculture, mining, and service sectors, data were culled out from Economic Survey of Orissa state (1992-93). On the basis of these data, average input-output coefficients for various sectors were estimated and these data formed the new column sums for updating the technology matrix. For the figures of sectoral row sums, it was not possible to get data on either sectoral total intermediate sales or final bills. In this regard, we have used the national figures after weighing down them through simple index of disparity in the level of income between India and Orissa state. Further, the data were available at current prices.

Infact, price indices for various sectors as per the sectorisation scheme of this study could not be available at the Orissa state level. Therefore, our analysis has been based on the information which are expressed in the current prices. An analysis based on data expressed in constant prices could enable us to have an idea of real technical changes of an economy. On the other hand, an analysis based on data expressed in current prices could reflect on changes in the cost structure of intermediate inputs for various sectors or alternatively, on technical changes in nominal terms. However, both the current price and constant price approaches serve one purpose that they could reflect on changes in interindustry interdependence.

7.3 Empirical Results

By using RAS procedure as outlined above, the input-output table prepared by us for the year 1983-84 has been updated to the year 1992-93 and given in the Table 7.1. Before discussing about this new table, the following things may be noted for convenience: firstly, we have not carried out multiplier analysis by using this new table. This lapse on our part has been due to the fact that labour, and capital stock statistics of various sectors were not available for the recent years. Our basic concern has been to reflect on some of the qualitative changes in the production structure of Orissa economy between the two years i.e. 1983-84 to 1992-93. Such an exercise would entice researchers as well as the policy makers for further research. Secondly, in the absence of data on various

(iv) sector specific intensity change could be in favour of service input by all sectors except coaltar, iron & steel, other basic metal, metal products, machinery, construction, transport, storage, trade and banking sector [3].

7.3.3 Structural Change in Orissa Economy

The relative strength of productivity effect, substitution effect , and sector specific intensity changes could affect the production structure of the Orissa economy.

It may be noted that productivity and substitution effect give us an idea about which way various producing sectors are moving in the economy, whether they are moving into the production of intermediate commodities or final commodities, and whether they are becoming technically dependent more on intermediate inputs or primary inputs within the region. Yet, their movements may or may not result in perceptible and qualitative change in the general production structure of the region's economy. In this context, Rassmusen's linkage analysis could be followed for a comparison between the production structures at two different points of time. Since, the capital stock data were not available for the year 1992-93, we would be able to compare them in terms of static input-output model. In this regard, we have estimated the static Leontief inverse matrix on the basis of updated input-output table for the year 1992-93 (see Table 7.4). Rassmusen's linkage indices have been constructed by using this new inverse matrix and have been presented in the Table 7.5. Finally, we have compared the structure of Orissa economy between two different years 1983-84

information can be used to update two tables prepared by us, the input-output table of the year 1983-84, or the forecasted input-output table of the year 1992-93. Last but not least, this chapter could provoke the policy makers in the sense that once a survey based table has been prepared, the same could be updated by using limited informations and help them in their plan formulation exercise.

7.4 Concluding Remarks

So far we have gone through the production structure, capital structure, multipliers, linkage indices, trade and technical changes. Our results in the chapter 4 on multipliers indicated weak correlation between growth and employment in Orissa economy. Linkage analysis, in chapter 5, suggested that the backward structure of Orissa economy has not moved in a way that is expected from economic progress over the planned periods. Also it was observed that there could not be many key manufacturing sectors of Orissa economy. In regards of regional trade sector in the chapter 6, it was observed that the structure of trade could not help the state to increase income and employment. Finally, our attempt to forecast technical changes, on the basis of limited informations, in this chapter 7, indicated that economic policies of last ten years could not have much impact on the production structure of Orissa economy.

In view of above, an urgent task for the policy makers of this poor region is to carry out suitable programmes for deliberate balancing of regional development of the state. For this, a comprehensive strategy of development must be devised by the policy makers after taking into consideration of the

immediate problems, potentials, and resources of the Orissa state. In this context, it was felt necessary that the present study may provide some thoughts to a strategy of regional development of Orissa state. We have devoted a special chapter 8 about such an issue.

NOTES

1. Seminar articles include Solow (1956), Romer (1986), Grossman (1990) and Maddison (1991). For recent combinations in input-output analysis see e.g. Round (1985), Wolff (1985, 1994), Feldman (1987), Blair and Wyckoff (1989), Skolka (1989), Barker (1990), Lin and Polenske (1995), Oosterhaven et al. (1995), Dietzenbacher (1995).

2. A detailed survey of various non-survey approaches can be available in Dalvi and Prasad (1985).

3. For comparatively matured sectors their dependence on service inputs will not increase much overtime.

Chapter 8

A STRATEGY OF REGIONAL DEVELOPMENT FOR ORISSA

In India, attempt towards regional development has been dominated by the national level policy makers for a long time. The national level policy makers, generally the bureaucrats and politicians, associated with regional development, often lack specific and local assessment of the problems, resources, and productive potentials of the regions in general and backward regions in particular. Regional scientists have viewed that a fruitful balanced regional development can be achieved only when the process of planning of the micro level regions starts with considerable clarity and within a consistent and comprehensive framework.

8.1 Thoughts on Regional Economic Development- Review

8.1.1 Need for Regional Development

Presently, it is being increasingly recognized, both on theoretical and empirical grounds, that countries experience, at least in the initial stages of national economic development, considerable regional unbalancing of economic development. Reservations have, however, been expressed about the need to take deliberate policy measures to remove these increasing regional disparities in level of living of the

people of backward regions. The underlying idea behind such a view is that lack of development of such a region is due to its lack of potential for economic development. Hence, it is argued that efforts to lessen regional imbalances would be at the cost of maximization of national economic growth. Surveys of regional planning in India by many economists, clearly indicate that an assumption of this kind, implicit in India's earlier five year plans resulted in measures to lessen regional disparities being taken in a very hesitant manner. A few including Ghose (1977) seem to go even further to argue that one should not bother too much about regional imbalances in countries like India, since these are merely the results of regional specialization.

However, it is conveniently forgotten in all these discussions that such a static comparative advantage doctrine would have never warranted economic development of most THIRD World countries, condemning them for ever to be primary producers, which they had become, often by sheer accident. In fact, as Nair (1972) and Raj Krishna (1980) have shown that there is hardly any basis for the assumption of the existence of regional equity-national efficiency trade-off in case of India, where the poverty pockets are the ones with rich mineral and other natural resources. At a more general level, many including Fukuchi and Nebukumi (1970), Sakashita and Kamoke (1974) and Mera (1973), doubt the existence of such a trade-off particularly if we adopt a dynamic and long term view. As a result, the strategy to be adopted and techniques of planning

regional dimension. This is despite the fact that there are quite a few international experiences of this kind is the Vanoni plan in 1950s to reduce North-South disparities in Italy by attempting to increase South's per capita income from 50 per cent of that of the north, to 75 percent over a period of ten years [4]. Williamson (1965) and Hirschman (1963) give details also for Brazil in this regard. A more recent instance of this kind is by Sebestyen (1973) for Hungary.

Many economists including Hanumanth Rao (1989) and Stohr and Taylor (1981) have pointed out in considerable detail the advantages, particularly while planning regional economic development, of decentralized planning implying grassroot participation in the formulation and implementation of plans, with china and Tanzania being quoted as outstanding success stories in this regard. These are shown to arise because of the greater probability of basic needs of the local people being taken into account at the formulation stage, greater awareness of local resources, institutions and linkages leading to the choice of more appropriate measures, greater chance of pressures to remove regional disparities, greater commitment for proper implementation and better monitoring and greater pressures to improve performance. Hanumanth Rao (1989) has clearly shown that in economic planning to remove regional disparities, in developing economies, a stage will be reached when the comparative advantage will be more with decentralized planning than with centralized planning and the general feeling is that India is at that juncture of planned economic

development when decentralized planning should come in vogue. But some economists, including K.N. Raj (1984) and Hanumanth Rao (1989) while examining decentralized planning in India have inferred that despite several official committees having stressed the need, decentralized planning in India, is yet, almost a non starter. Nair (1990 b) in a recent survey of decentralized planning in India, has attributed this to its more difficult nature in terms of data requirements, general awareness among people and regional ubiquity in plan expertise, to the increasing tendency towards centralization at all levels in India, to the absence of land reforms and to the lack of constitutional provisions for the creation and development of grassroot Panchayat Raj institutions.

8.1.4 Contemporary Regional Issues In India

Recently, people are increasingly becoming aware of regional problems. Because it has been felt that the centralized planning in India has not been able to solve the problems of poverty, unemployment, inadequate basic social services such as education, health & sanitation, water supply, and electricity, poor quality of infrastructure, inappropriate agriculture and industrial development in backward regions. There have been ten number of finance commissions and a special Sarakaria Commission involved with center-state relations, mainly, financial and constitutional relations. Yet, the center-state relation has not considerably improved and consequently, the unbalanced nature of center-state relation has become a hot topic for intellectuals across the

commented: "we are not beggars at the door of the central government". The concepts of "weak center" and "financially autonomous states", evolved by some regional leaders of high esteem, have indicated the growing concern for regional issues.

It has been clearly felt that the inefficient resource allocation mechanism at the centre, the dismal performances of public sectors located in the backward regions, and non-confidence over central level policy makers that have led some of the prominent regional leaders to cut off their long affiliation with the centralized and socialist planning process of the country. Regional leaders are gaining confidence to compete for attracting private sectors in general, and foreign investors in particular in order to strengthen the financial resource base of their regions. A sound financial resource base is considered to be very important for improving the quality of infrastructure, and for increasing the production base of backward regions. At the same time, there has been a concern for selection of appropriate projects funded by large business houses within the country, and also funded by the foreign investors. They have preferred foreign "computer chips" to foreign "potato chips". Similarly, the choice between the public sector and private sector is considered immaterial to regional scientists in India. According to Rao (1992), the debate about private and public sector is a non-issue. Therefore, it is believed that the approach to regional development is not going to be diluted by any particular ideological system either socialist system or market oriented

system. Instead, it seems that the approach to regional development of backward regions is going to be broad based and problem oriented.

In view of above, it was felt necessary for this study to put some thoughts on a strategy of regional development of the Orissa state. The entire idea behind the proposed strategy has been incorporated in a schematic diagram 8.1 and has been elaborated in the next section. Also, we have displayed an interactive data based model in reference to the ideas of the proposed strategy of development for Orissa state, in diagram 8.2. This would give an idea of organizing important information for planning exercises in the future.

8.2 A Strategy of Regional Development of Orissa State

At the outset, the regional planners must consider three important factors in their choice of strategy of regional development. These three factors are (i) region's potentials. (ii) socio-economic-political environment (iii) objectives. These three factors could be inter-dependent for an economy.

(i) Potentials

The region's potentials include, largely, financial resources, and physical resources. An appropriate assessment of resources of the region is a must for devising a strategy of regional development. Financial resources must include resources that could be generated within the region, resources available from the central government by way of grants, state's share of central revenue and others, and resources available from national and international financial institutions, over a plan horizon.

within the region to produce for the small parts and equipments, if not the machinery products, needed for the agriculture and agro-processing sectors. This way, the policy makers can achieve an integrated sectoral development within their region.

With economic progress, some macro economic parameters must be improved in order to keep the process of development going over time. Propensity to consume, or save, rate of investment, profitability in production, adequate capital formation in basic infrastructure are some of the important considerations at this juncture. Further, as the economy becomes self sufficient in agro products, external trade, particularly export of goods that could help the regions by way of increasing income, employment and growth must be promoted.

8.3 Modelling the Strategy of Regional Development

An well organized programme of regional development must be backed by a comprehensive and consistent technical framework. For this purpose, an ideal model must encompass a series of data based models relating to important objectives and variables of a regional economy. Because, any particular model such as macro econometric model or Input-Output model or programming model may not be sufficient to translate the ideas of an intended strategy of regional development. For an individual researcher, it may be difficult to deal with several models at the same time. But in view of government, it could not be that much difficult. A group of researchers or a working group can handle a series of relevant models necessary for the

technical planning exercises. In view of the strategy of regional development of Orissa state outlined in above, we have displayed how an interaction between some relevant models could be achieved. Regional planners must include four sub-models in their modelling exercises:

(i) Linear Programming model

(ii) Input-Output model

(iii) Fiscal Model

(iv) Econometric Model

(v) Sector-specific models.

(vi) Demography Model

(vi) Price Model

As mentioned above, a backward region faces many constraints. Therefore, a constrained optimization solution could be the right approach for such a region. In a constrained optimizing model involves four important aspects : (i) objectives, (ii) constraints and (iii) parameters and (iv) use of priors (i.e., imposing deterministic solutions).

In view of modelling the strategy of development of a backward region like Orissa state, this state should set the objective of maximum income, and maximum employment. If the objective is maximum income, then maximum employment can be set as priors by specifying those sectors in which maximum employment has to be achieved. Similarly, if the maximum employment is taken as the objective function, maximum income can be set as priors to the model by specifying the sectors in which maximum income has to be maintained. Also, priors can be used for specifying the growth rate of the economy in general

or growth rate of capital intensive sectors in particular. A programming model becomes meaningless if the constraints are not recognized. We have the following constraints handled by the input-output model.

In case of the constraints, the state has to recognize the constraints such as technological constraints, demand constraints, resource constraints and specific supply bottlenecks. The input-output model should form the core model by depicting the technological constraint in terms of interindustry production, and capital structures, demand for primary inputs of land, labour and others. Certain supply bottlenecks relating to important energy sectors and infrastructure sectors should be incorporated within the input-output model. The role of input-output model has to form the core model in order to supply sector-specific information about the technical production structure, capital structure, income and employment multipliers etc. The main role of Input-Output model would be to complement the entire modelling exercise in order to arrive at sectoral targets.

Financial resource constraints can be specified separately or by relating to the parameters of demand constraints. A fiscal model is needed if the financial resource constraint has to be recognized in the overall model for the planned development. The role of fiscal model is to assess the sources of funds from government, private and external sectors.

An Econometric model has to be used for forecasting macro parameters such as propensity to consume broad items of food

and non-food, propensity to save, rate of investment, elasticity of government revenue and expenditure, propensity to import, elasticity of export and import. The basic role of an econometric model has to be to capture the relationship between above macro parameters and their determinants such as income, wages, prices, interest rate, exchange rate and tariffs. At the same time econometric model could be used for estimating some parameters of fiscal model.

The macro parameters, resource positions of both financial and physical resources, and weightage to short term and long term objectives must satisfy the objectives and allocation pattern of resources between low capital intensive short run objective oriented sectors, basic infrastructure, and high capital intensive long run objective oriented sectors.

A demographic model must be there for the projections of supply of labour force, composition of labour force such as technical and non technical manpower, low and high income class, rural and urban differences.

A pricing model has to be there for proving information in respect of wages, interests, rents, profits and prices of commodities to the econometric model in order to determine the parameters of final demand components. Besides, a price model can complement be used for achieving consistency solutions in value terms.

Besides, some sector-specific studies in respect of basic infrastructure sector must be developed in order to have an idea of demand and supply positions. These sector-specific

First, according to Richardson (1972), input-output models are value free systems. They have been used alike by capitalist as well as socialist economies for a wide range of problems.

Secondly, an input-output model is a theoretically simple technique for recognizing the interdependence among the various agents of an economic system such as producers and final users. By grouping the productive activities of firms into various industries (or sectors) it is possible to describe the overall balance between the supply of and the demand for various products in terms of a simple set of linear equations.

Thirdly, input-output models are being adopted more frequently for short to medium term economic forecasts. Given the knowledge of exogenous variables and assuming constant input-output coefficients, future levels of production, investment and employment can be predicted.

The idea of interdependence among different producing and consuming units is very basic to the input-output analysis. This idea was rooted in the general equilibrium theory of Leon Walras. But Walras model was too complicated to be used in the empirical studies and remained unused until professor Leontief invented the tool of input-output technique and applied it to the data available for the U.S. economy during nineteen thirties (Leontief, 1936).

At this juncture, some more lines are needed to emphasize on the interdependence of producing and consuming units and the implications of a multisectoral input-output model. Let us first consider a Keynesian type aggregative macro model in

Chapter 3

REGIONAL INPUT-OUTPUT TABLES FOR ORISSA ECONOMY

The aim of this chapter is to present the basic estimates of input-output tables and interpret these tables in a summary manner. However, before that it would be necessary to explain their structure and concepts used in our study.

3.1 Structure of Orissa's Economy

As mentioned earlier in chapter 2 that Orissa state's economy has been divided into thirty one sectors. In this sectorization scheme, there has been one primary sector that includes agriculture and allied sectors i.e animal husbandry, forestry and fishing activities, one mining sector, twenty three manufacturing sectors, and six sectors related to services. In the secondary sector category, ten manufacturing sectors are related to agriculture and its allied sectors as they use agro products as inputs. Thus they can be called as agro-based manufacturing sectors. These are food, beverages, tobacco, cotton, jute, misc. textiles, wood, paper, leather and rubber sectors. The remaining thirteen sectors are non-agro-based manufacturing type. These are coaltar and petroleum products, fertilizer and pesticides, chemical products, cement & cement products, non metallic mineral products, iron & steel alloys, other non ferrous basic metal alloys, metal products, machinery & other equipments, misc.manufacturing, construction,

TABLE 3.1 : Sectorization Scheme of the Present Study

Sector No.	Sector Name	Short Name
1.	Agriculture, Animal Husbandary, forestry, fishery	Agriculture
2.	Mining & Minerals	Mining
3.	Food Products	Food
4.	Beverages	Beverages
5.	Tobacco	Tobacco
6.	Cotton Textiles & Products	Cotton
7.	Jute Textiles	Jute
8.	Misc. Textiles	Misc. Textiles
9.	Wood, furniture & fixtures	Wood
10.	Paper and paper Products	Paper
11.	Leather and Leather Products	Leather
12.	Rubber and Plastic Products	Rubber
13.	Coalter and Petroleum products	Coaltar
14.	Fertilizer & Pesticides	Fertilizer
15.	Chemicals & Chemical Products	Chemical
16.	Cement and Cement Products	Cement

Sectors	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	0.0218	0.0379	0.0026	0.0279	0.0161	0.0253	0.0519	0.0100	0.0017	0.0118	0.0373	0.0109	0.0064	0.1976
2	0.2924	0.0925	0.1526	0.0406	0.0309	0.0194	0.0390	0.0533	0.0058	0.0267	0.0034	0.0063	0.0037	0.0062
3	0.0040	0.0066	0.0006	0.0047	0.0028	0.0034	0.0055	0.0017	0.0003	0.0018	0.0114	0.0020	0.0007	0.0358
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0010	0.0002	0.0000	0.0002	0.0001	0.0003	0.0002	0.0000	0.0000	0.0004	0.0001	0.0001	0.0000	0.0005
7	0.0047	0.0007	0.0001	0.0011	0.0007	0.0022	0.0029	0.0001	0.0001	0.0003	0.0002	0.0016	0.0001	0.0010
8	0.0001	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0001	0.0001	0.0000	0.0001
9	0.0017	0.0005	0.0001	0.0011	0.0010	0.0017	0.0055	0.0002	0.0001	0.0007	0.0001	0.0004	0.0003	0.0004
10	0.0135	0.0026	0.0006	0.0049	0.0039	0.0105	0.0028	0.0014	0.0058	0.0033	0.0051	0.0011	0.0256	0.0055
11	0.0002	0.0002	0.0000	0.0001	0.0001	0.0003	0.0001	0.0000	0.0000	0.0002	0.0002	0.0037	0.0000	0.0002
12	0.0012	0.0004	0.0001	0.0007	0.0015	0.0021	0.0003	0.0001	0.0002	0.0004	0.0028	0.0010	0.0001	0.0006
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0002	0.0004	0.0000	0.0003	0.0002	0.0003	0.0005	0.0001	0.0000	0.0001	0.0004	0.0001	0.0001	0.0019
15	0.0092	0.0029	0.0134	0.0040	0.0096	0.0167	0.0055	0.0008	0.0052	0.0011	0.0007	0.0039	0.0007	0.0004
16	0.0264	0.0003	0.0000	0.0002	0.0001	0.0003	0.0062	0.0002	0.0000	0.0005	0.0000	0.0003	0.0002	0.0001
17	1.0852	0.0037	0.0004	0.0035	0.0029	0.0107	0.0978	0.0025	0.0004	0.0101	0.0008	0.0045	0.0033	0.0030
18	0.0572	1.3851	0.0014	0.4390	0.1646	0.1542	0.1419	0.0070	0.0040	0.0370	0.0055	0.0088	0.0061	0.0023
19	0.0023	0.0058	1.0065	0.0509	0.1150	0.0029	0.0022	0.0009	0.0006	0.0060	0.0112	0.0019	0.0010	0.0009
20	0.0038	0.0133	0.0003	1.0105	0.0369	0.0095	0.0021	0.0005	0.0025	0.0057	0.0011	0.0012	0.0004	0.0004
21	0.0093	0.0222	0.0024	0.0097	1.0447	0.0095	0.0134	0.0072	0.0035	0.0506	0.0286	0.0130	0.0080	0.0033
22	0.0000	0.0004	0.0000	0.0001	0.0001	1.0004	0.0001	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000
23	0.0184	0.0284	0.0038	0.0165	0.0129	0.0076	1.0071	0.0239	0.0038	0.0778	0.0037	0.0449	0.0330	0.0075
24	0.0175	0.0407	0.1480	0.0288	0.0321	0.0140	0.0165	1.1025	0.0139	0.0261	0.0039	0.0834	0.0079	0.0091
25	0.0016	0.0039	0.0008	0.0015	0.0011	0.0008	0.0017	0.0048	1.0018	0.0009	0.0006	0.0016	0.0013	0.0031
26	0.0202	0.0559	0.0038	0.0189	0.0168	0.0144	0.0231	0.0229	0.0025	1.0169	0.0097	0.0035	0.0126	0.0077
27	0.0550	0.0410	0.0041	0.0201	0.0202	0.0193	0.0435	0.0109	0.0049	0.0201	1.1576	0.0592	0.0191	0.0778
28	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0001
29	0.0032	0.0034	0.0004	0.0048	0.0041	0.0010	0.0016	0.0025	0.0015	0.0020	0.0055	0.0007	1.0003	0.0042
30	0.0928	0.1887	0.0111	0.1374	0.0767	0.0932	0.1547	0.0495	0.0048	0.0494	0.1183	0.0389	0.0179	1.0644
31	0.0283	0.0309	0.0028	0.0138	0.0170	0.0151	0.0145	0.0055	0.0007	0.0412	0.0166	0.0030	0.0018	0.0400
	1.7713	1.9687	1.3561	1.8406	1.6121	1.4351	1.6410	1.3086	1.0641	1.3905	1.4252	1.2963	1.1505	1.4744

Table 5.1 Rassmusen's Linkage Indices for Producing Sectors of Orissa, year 1983-84

sector no.	sector name	static model		dynamic model	
		backward linkage	forward linkage	backward linkage	forward linkage
1	AG	0.7653	2.7323	0.7539	2.8384
2	mining	0.7545	1.7711	0.8711	1.6795
3	Food	1.2548	0.9175	1.1900	0.8048
4	Beverages	1.0517	0.6873	1.0011	0.5699
5	Tobacco	0.8973	0.6814	0.8925	0.5654
6	Cotton	1.0698	0.7738	1.0079	0.6480
7	Jute	0.8920	0.7559	0.8733	0.6453
8	Misc.Textiles	0.8578	0.6840	0.7793	0.5669
9	Wood	1.1377	0.7134	1.0453	0.6060
10	Paper	0.9536	0.8148	0.8651	0.6920
11	Leathr	1.0499	0.7196	0.9324	0.5978
12	Rubber	0.9620	0.7340	0.8620	0.6174
13	Coaltar & petroleum	1.1468	0.6805	1.3131	0.5634
14	Fertiliser	1.0114	0.7246	1.0097	0.6149
15	Chemicals	1.0081	0.8508	1.0023	0.7422
16	Cement	1.2368	0.7500	1.1912	0.6402
17	Non-metallic mineral	1.2052	0.8669	1.1834	0.9162
18	Iron & Steel	1.3395	1.7267	1.3723	2.0126
19	Basic Metal	0.9227	0.8417	0.8677	0.7947
20	Metal products	1.2523	0.7531	1.1822	0.6652
21	Machinery	1.0969	0.9093	1.0216	1.5788
22	Misc. Manufacturing	0.9764	0.6817	1.0577	0.5649
23	Construcion	1.1165	1.0553	1.0305	2.6658
24	Electricity	0.8904	1.3352	1.0544	1.1797
25	Gas	0.7240	0.7373	0.6136	0.6163
26	Railway	0.9461	0.9173	1.3707	0.8251
27	Transport	0.9697	1.2746	0.8421	1.2229
28	Storage	0.8820	0.6836	1.0957	0.5664
29	Communication	0.7828	0.7278	1.0017	0.6101
30	Trade-Hotels	1.0031	2.2766	0.9527	2.3145
31	Banking	0.7720	1.2220	0.8835	1.0747

percent, railway 33 percent, trade 28 percent, minerals 24 percent, non metallic minerals 22 percent, other basic metal alloys 12 percent, cotton 2 percent, rubber 2 percent, and banking services 3 percent. From these figures, it may be noted that the state is exporting largely some basic materials i.e metal alloys, paper, cement, nonmetallic minerals, and services. The figures clearly indicate that the goods are exported because of insufficient demand within the region. The fundamental reason behind this pattern of export could be the underdeveloped manufacturing sector in the state. Another feature of above mentioned exporting sectors is that they are relatively more capital intensive sectors in the state.

On the other hand, it can be seen that the state imported all kinds of commodities. In agro-processing sectors, Orissa state's import of misc.textiles product formed 95 percent of the size of domestic demand for the output of that sector and was followed by beverages 94 percent, wood products 88 percent, leather 80 percent, rubber 69 percent, cotton 68 percent, jute 64 percent and food 19 percent. In similar way of expression for non agro-based manufacturing sectors, we have coaltar 99 percent, misc.manufacturing 98 percent, metal products 83 percent, chemicals 82 percent, machinery 76 percent, fertilizer 67 percent, electricity 46 percent and other basic metal alloys 45 percent. This pattern of export and import in Orissa may provoke one to guess that there could be some adverse effects of external trade on the state's output, income and employment. In this regard, let us see our next section on empirical results.

is the row sum of input-output coefficients in the row of ith sector in the year t while $U_{i,o}$ is the same in the base year.

If σ_j comes out to be greater than one, then there will be positive productivity change in the sector j. If it is less than one, then there will be negative productivity change in the sector j. Similarly, μ_i greater than one will imply positive substitution effect for the sector i and μ_i less than one will imply negative substitution effect for the sector i.

In above formulation, we have the knowledge of σ_j since we have information about the column sums i.e total value of all intermediate inputs used by a sector for the base year, $V_{j,o}$ and for the current year, $V_{j,t}$. Similarly, we have information about the row sums i.e intermediate sales of all sectors for the base year, $U_{i,o}$ and for the current year, $U_{i,t}$. The initial iteration of this updating procedure can start either from row side or column side. Suppose, we start from row side. In the first iteration, the rows of the base year table are adjusted by multiplying ith row by the factor μ_i. When we adjust the rows, the columns will be changed. If we observe that the column sums resulting from the first iteration are within five percent limit of the current column sums in various sectors, then the iteration has to stop. Otherwise, the resultant column sums and the current column sums will be used to derive σ_j. In the second iteration, this estimated σ_j will be used to adjust the column sums of the matrix resulting from the first iteration. This way, the rows will be changed. If we find the error of the row sums for each sector within five percent, then

industries at growth poles on areas surrounding these. Followers of such an approach like Friedman (1973) and Hansen (1981) hence opine that developing economies with scarce resources should place their few available investment eggs in chosen growth pole baskets to maximize national economic growth, rather than spread them very thinly all around the nation. Many developing economies, particularly in Africa, adopted such a strategy, but the experience of many of these as pointed out by Salau (1988), among others, is that the supposed percolation effects do not generally take place. Stress has hence shifted from big urban industrial growth poles to a hierarchy of towns, concentrating also on agriculture and service activities and spread out much more regionally. This is all the more so if we consider concepts of growth foci as developed by Misra (1971), and agro-politan regions as developed by Friedman and Douglass (1978). The emphasis thus seems to be moving away from deliberate unbalancing by concentrating investment on very few large urban industrial centers to the view of Williamson (1965) of taking deliberate measures to spread investment in a more regional balanced manner to lessen regional disparities in levels of living.

8.1. 3 Techniques of Regional Planning

It is surprising that though there is almost universal recognition of the need for deliberate policy measures to lessen regional disparities in levels of living, planned economies, where sectoral planning is usually much in vogue, rarely go in for the regional planning. Many analysts, have pointed out that planning in India has not had, as yet, a